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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Coal "Berginisation" Prospects

THE reports published this week from Berlin respecting the Bergius process for the liquefaction of coal contain little information that was not already familiar to oil and fuel technologists. The one new important fact is the issue of a German State grant or guarantee of 2,500,000 marks towards the cost of erecting works at the Wenceslaus coal mines in Lower Silesia for the treatment of large quantities of coal by this new method. This indicates that the Bergius process has definitely passed from the experimental into the commercial stage, and that the idea of converting coal into liquid fuel is now recognised from the public point of view as a matter of international importance. Rather hastily, some hope has been raised that in this development may be found a remedy for the present economic difficulties in the coal industry. It is not impossible that some good effect may result; but the essential importance of the change lies in the immense further step that it marks in the displacement of solid by liquid fuel. If industry has definitely given its verdict in favour of the liquid form, larger and larger supplies of oil will be required. Correspondingly, the demand for coal in the natural state for power production on land and sea—and the lack of demand is one of the admitted causes of the present depression in the coal industry—must further decline. The enterprise now announced means that Germany is once again the first nation to utilise the resources of science in meeting the needs and methods of the future. It may mean, too, supposing the German scheme to be a success, changes of a drastic kind in the handling of our coal supplies, from the moment they reach the pit head.

Although Germany has now practically demonstrated its belief in the commercial efficiency of the Bergius process, it by no means follows that its success is yet established. At the same time, opinion is distinctly favourable. For quite a long time past we have heard from fuel technologists in close touch with German developments accounts of the remarkable results obtained, accompanied by not a few growls at the proverbial difficulty of making British interests sensible of the importance of what was going on. Latterly, however, the Government scientific and commercial services have been in personal contact with the German researches, and we understand that an arrangement has been made for our being kept informed of any important developments. One interesting fact already obtained is that British coals appear to be especially suitable in composition for treatment by the Bergius method. At Mannheim, for example, where the large scale experimental work has been going on, British coals have been transformed into liquid and gaseous products to the extent of 85 per cent. by weight at the expense of hydrogen equal to 10 per cent. by weight of the coal, while in recent experiments with coarsely powdered Arley coal at the British Fuel Research Station the total conversion into oil and gas amounted to 70·5 per cent. of the dry ash-free coal. In addition, the liquefaction process may make available for fuel large quantities of "duff" coal of which little if any use is now made. From the chemical point of view the composition of the oils obtained by the "berginisation" of coal is a matter of the utmost interest, and although the published results are scanty we understand that considerable research is proceeding in this field.

The Bergius process would be sufficiently notable, as an example of Germany's preparations for the future, if it stood alone. Beside it, however, must be considered the catalytic process for producing synthetic methyl alcohol—commercially known as "methanol"—from water gas. Both processes, it is understood, are controlled by the Badische Co., which has already revolutionised two industries by its development of synthetic dyestuffs and its perfection of Haber's process for the fixation of atmospheric nitrogen. To us in this country the availability of a much cheaper synthetic power alcohol is of considerable interest. It affects in the first place all British manufacturers of industrial alcohols; it affects, secondly, our large imports from the United States and Canada. Its effect on America is still more serious; it threatens

the very existence of America's wood alcohol industry, in which huge sums are invested. Two protective measures are contemplated. The first is the increase of the American tariff on imported methanol by 50 per cent., an application for which has been already filed in Washington. Even if granted, which is unlikely, it is doubtful if the increase would be effective; it might merely result in the erection of German plants in America. The other is the acquisition of the American rights in a rival synthetic process. From this point of view Patart's work in France is of vital interest to American alcohol firms, whose representatives have been reported for some weeks to be sitting on the French explosive inspector's doorstep in their anxiety to counter the methanol menace. Meanwhile Fischer has elaborated the process and succeeded in producing a mixture of higher alcohols and ketones, known as "synthol." When developments of this kind from a new base once begin, there is no knowing where they may ultimately end. In such circumstances, the importance of keeping this country in the closest touch with continental research and experiment is too obvious to need emphasis, if we are not to fall hopelessly behind other nations.

The Mechanism of the Bucher Process

SOME interesting light is thrown on the mechanism of the process for the fixation of nitrogen by a heated mixture of sodium carbonate and carbon, with finely divided iron as a catalyst, in a communication which has recently been issued by the Fixed Nitrogen Research Laboratory of the U.S. Department of Agriculture. This process, it will be remembered, sprang into considerable prominence during the war, when the published investigations of Bucher led to new attention being given to the unsolved problem of the economic production of cyanides by the absorption of nitrogen. It has been realised that the investigation of the system would be greatly simplified were it possible to study separately the intermediate reactions leading to the final result, and it would now appear that Messrs. E. W. Guernsey and M. S. Sherman (who are responsible for the above communication) have succeeded in establishing the nature of these intermediate reactions. It may be well to recall that the reaction is represented by the following equation :—

$$Na_2CO_3+4C+N_2=2NaCN+3CO.$$

Those who have speculated on the mechanism of the system have generally agreed that metallic sodium is first formed, but various hypotheses have been advanced regarding the formation of cyanide from the three elements. At one time or another quite a number of theories have been put forward as to the true intermediate compound in the formation of sodium cyanide, but Berthelot so long ago as 1858 first suggested the hypothesis that sodium carbide is formed, which he supposed might then absorb nitrogen to form sodium cyanide in a manner analogous to the formation of hydrogen cyanide from acetylene and nitrogen in an electric spark.

It is not necessary to describe the interesting experimental plan which was followed in the recent American investigation, and in which a part only of the reacting constituents in the sodium carbonate—carbon—iron mixture was taken at a time, thus enabling a study to be made of the reactions in the more simple systems built up, but it is sufficient to note that Berthelot's hypothesis was proved to be correct by showing the improbability of the formation of sodium nitride or cyanogen as an intermediate compound, and by carrying out experimentally each step necessary to the formation of cyanide through sodium carbide as an intermediate compound. The long and careful work which the American investigators have completed may, in fact, be summarised by stating that the formation of sodium cyanide in a mixture of sodium carbonate, carbon, and iron catalyst when heated in nitrogen takes place through (1) the reduction of sodium carbonate to metallic sodium, (2) the formation of sodium carbide from the elements, and (3) the absorption of nitrogen by (gaseous) sodium carbide to form sodium cyanide. As regards the part played by iron, this was shown to exert a marked catalytic effect on the absorption of nitrogen by sodium carbide, but it did not appear to be essential for the reduction of sodium carbonate or for the formation of sodium carbide. The establishment of the exact mechanism of the reaction is, perhaps, mainly of theoretical value at the moment, but in these days of rapid progress it is never possible to tell when a process of the kind may not become an important factor from the industrial standpoint, when the value of research such as this becomes self-evident.

A New Use for Crude Ammoniacal Liquor

THE latest issue of the booklet containing agricultural notes which has been distributed by the British Sulphate of Ammonia Federation should be of particular interest to some of the smaller producers of crude ammoniacal liquor. At present there are quite a number of instances where the production of this liquor is on too small a scale to warrant its working-up into sulphate of ammonia, while its disposal as a waste product is not always an easy matter in view of the present-day watchfulness of local authority officials. During the present year, too, the market in all residuals resulting from the carbonisation of coal has been in an unduly depressed condition, so that with lower prices prevailing for sulphate of ammonia there must inevitably be a number of smaller works which have discontinued sulphate manufacture. In the booklet referred to Mr. A. P. Allan describes how a new outlet may be found for crude ammoniacal liquor by applying it to straw and using it in conjunction with ordinary organic farmyard manure, a procedure which would not only utilise the surplus straw (in many cases difficult to dispose of profitably) but make good the deficiency of manure with which the majority of farmers are faced. It is not possible to describe here the actual details of applying the crude liquor, but the process is comparatively simple and has, Mr. Allan states, been adopted with considerable success by a number of farmers throughout the country. It now remains for those small producers of crude liquor, such as the country gasworks, to take steps to inform likely consumers in their neighbourhood of the advantages of the process, and it is, of course, scarcely necessary to state that the B.S.A.F. is always

ready to forward full particulars to those who are interested.

Mr. Allan's reference to the problem of liquor disposal recalls other suggestions which have from time to time been put forward in connection with its utilisation. At one time quite a number of producers were doing a good local business by converting it into household ammonia, but this, of course, was a process suitable for the larger works only. A more promising outlet for small quantities seems to lie in the suggestion of M. Chevalet, who found that the liquor formed an admirable medium for the treatment of boiler feed-water. If a small quantity of ammoniacal liquor, sufficient to produce an alkaline mixture, is added to the untreated water, cloudiness results, which proves to be due to precipitated carbonate of lime previously combined with the carbon dioxide in the water. The process consists in the repeated agitation by steam of the feed-water as it flows over trays, the ammoniacal liquor being added to the water drop by drop. A rough indication of the quantity of liquor required may be obtained by taking a sample from the outlet of the softener and adding an excess of liquor, when the absence of a precipitate is an ample safeguard. It is said that the process presents a method of feed-water treatment which is very simply controlled from the chemical standpoint, and calls for plant of far smaller dimensions than is necessary with more general methods.

Oil and Meal from Surplus Fish

REFERENCE was made in a recent issue, in the course of an editorial note on the treatment of surplus fish for the recovery of oil and the production of feeding meal, to the California continuous process. In view of inquiries that have reached us on the subject, some more detailed account of this process may be of interest. It appears that the latest machine deals with over ten tons of raw fish per hour. The fish is passed through a continuous and automatic steam cooker in which the pressure is regulated. The material discharged is fed direct to a hopper of a continuous and automatic press designed to prevent the passage of suspended matter through the screens. The orifices of the latter are extremely fine—10,000 to the square inch—and the screen bars are able to resist a pressure of 8,000 lb. per square inch. By utilising this plant the product is delivered to the dryer with a minimum of moisture and oil. Thus the oil content of the meal, which is a distinct feature from a sales point of view, is reduced, about two gallons more oil per ton of raw fish handled is recovered, and the costly external evaporation process is diminished appreciably. From the press the material is fed to an indirect heat dryer. It is here where a radical departure from existing practice is made. The inevitable scorching and discoloration which accompany the direct contact of fish with hot gases are overcome, and approximately two units of ammonia per ton of meal are conserved. Altogether there appear to be many advantages attending the new process, but how it compares with the extraction process as used in this country from the point of view of cost of operation and suitability of final products, it is impossible to say. We feel certain that those works in this country which are interested in the treatment of fish offal, etc., will not be slow to take advantage of any new process if the extra realisation from the final products warrants a modification or alteration of existing plant.

July Trade Returns

PRELIMINARY figures relating to our overseas trade for July show a marked increase in exports and decrease in imports. The imports (£98,744,849) are the smallest monthly totals recorded since June, 1924, and are £12,000,000 lower than in June, and £10,000,000 lower than in July of last year. The exports amount to £64,826,369, as compared with £58,893,190 in the preceding month, and £71,283,289 in July of 1924. The July figure is within 1 per cent. of the average for the first six months of 1925, and the serious falling off in the second quarter of the year is thus not continued into July. The re-exports of imported merchandise for July amount to £11,376,230, as compared with £10,600,201 for the previous month, and £10,174,629 for July of last year. The detailed figures of the July returns are not yet available, and for the chemical trade statistics we must wait for the issue of the official volume.

Points from Our News Pages

The manufacture of sulphuric acid by the contact process is discussed by Mr. P. Parrish (p. 168).

Non-corrodible and non-scaling steels were exhibited recently at Burlington House (p. 171).

The question of lead in paint has been raised in Parliament (p. 172).

The Piece Dyers' Association have reported on textile dyeing prices (p. 172).

The Sugar Beet Industry is the subject of a White Paper just issued (p. 182).

Books Received

KOLLOIDCHEMIE. By Richard Zsigmondy. Leipzig: Otto Spamer. Pp. 242. 11 marks.

REPORT ON THE COMMERCIAL AND INDUSTRIAL SITUATION IN HUNGARY, dated March, 1925. By E. C. Donaldson Rawlins. London: H.M. Stationery Office. Pp. 50. 1s. 6d.

THE ELECTRICAL INDUSTRY IN FRANCE. London: The Economic and Statistical Department, British Electrical and Allied Manufacturers' Association (Inc.). Pp. 54. 2s. 6d.

PROCEEDINGS OF THE CHEMICAL ENGINEERING GROUP (Vols. 5 and 6A, combined) 1923-1924. London: The Chemical Engineering Group. Pp. 130. 10s. 6d.

CELLULOSE ESTER VARNISHES. By F. Sproxton. London: Ernest Benn, Ltd. Pp. 178. 15s.

BLACKS AND PITCHES. By H. Langton. London: Ernest Benn, Ltd. Pp. 179. 15s.

SULPHURIC ACID REACTION CHAMBERS. By P. Parrish. London: Ernest Benn, Ltd. Pp. 159. 6s.

The Calendar

Aug. 26 to Sept 2	British Association for the Advancement of Science.	Southampton.
Oct. 4	Société de Chimie Industrielle: Fifth Annual Congress	Paris
Oct. 23	Engineers' Club: Annual Dinner.	Savoy Hotel, London

The Manufacture of Sulphuric Acid (Contact Process)*

By P. Parrish, A.I.C., M.I.Chem.E.

It is to be regretted that no earlier opportunity has occurred of reviewing the book which was published by Gurney and Jackson about two months ago on the subject of *The Manufacture of Sulphuric Acid* (*Contact Process*), by F. D. Miles. The volume is an important one, and certainly takes pride of place in the Lunge and Cumming series, of which it forms a part. It is as much a credit to its author as it is an adornment to the period of enlightened chemical activity in this country, which characterised in a notable way the war years of 1915–1918.

The writer recalls raising the question of the economics of the manufacture of sulphuric acid by the chamber process, as contrasted with its production *viâ* oleum, with an acid manufacturer about fifteen years ago. Much to his astonishment he found that this gentleman had little notion of what oleum was, still less did he appreciate the principles underlying its preparation or the important pecuniary considerations which its manufacture raised. This circumstance is mentioned not with a view of casting any reflection upon chemical manufacturers of a decade and a-half ago, but as an indication that in the year 1911 the production of and the demand for oleum was strictly limited and was almost wholly confined to explosives works.

Technology and Science

It does not always follow that technological progress is dependent upon the advance of pure science. On the contrary, the development under consideration strikingly demonstrates that scientific knowledge was unnecessary to the realisation of the commercial possibilities of a process of the highest technical significance.

To Peregrine Phillips belongs the credit for the conception of and for indicating the fundamental feature pertaining to the contact process of sulphuric acid manufacture. Yet no record appears in the history of either academic or technical science, except the one under notice, of his activities.

Peregrine Phillips was a vinegar manufacturer of Bristol, and it was in 1831 that his specification No. 6,096 was published for "Certain Improvements in Manufacturing Sulphuric Acid, commonly called Oil of Vitriol." A perusal of the patent makes it clear that Phillips understood the fundamental feature of the contact process, and although practical experience has served to elaborate the process, and scientific knowledge has led to a better appreciation of the kinetics of catalysis and other physico-chemical phases, nothing has disturbed the earlier conception.

Quite rightly does Mr. Miles remark that "hardly any chemical reaction between gases has been of greater interest from the purely chemical point of view—as an example of the principles involved in all gas reactions, or as a starting point for investigations in the mysterious field of catalysis"—than the one involving the production of sulphuric anhydride.

The Manufacture of Oleum

In general, the manufacture of oleum involves the passage of sulphur dioxide of given concentration, along with atmospheric oxygen, over a catalyst for the production of sulphur trioxide, which is subsequently absorbed in strong sulphuric acid. The primary gaseous mixture results from the combustion of sulphur material, either in the form of brimstone, pyrites, or zinc blende, in air. But as impurities are associated with this mixture (apart from moisture), cooling, purification and drying, and the elimination of sulphuric acid mist are involved and, indeed, constitute important steps in the process.

Thus the unit processes entailed are (1) combustion, (2) cooling (involving, usually at one stage, heat interchange), (3) filtration, (4) scrubbing, (5) gas drying, (6) preheating (usually at two stages), (7) catalysis, and (8) absorption.

In his treatment of the subject, Mr. Miles wisely avoids discriminating too sharply between the technical and scientific aspects of the process. Indeed, he remarks in this connection that "there is nothing to be gained in the long run and there is much that may be lost." Throughout the volume the treatment of the process is at once technical and scientific, and descriptions of plant are deferred, pending the completion of this discussion.

Combustion of Sulphur Materials

This aspect is apparently confined to what may be termed the descriptive portion of the book. The combustion of sulphur in hand burners, although a comparatively simple operation as applied to the chamber system of sulphuric acid manufacture, involves a greater exactitude where the oleum process is concerned. Although Grillo hand sulphur burners make provision for dealing with sublimed sulphur by affording a supply of secondary air and thorough mixing in the incandescent chequer work, the arrangement does not allow of that steady combustion which is a *sine quâ non* to a uniform sulphur dioxide concentration. To obtain the greatest possible constancy of gas composition, Mr. Miles points out that the by-pass slides between the two flues must be adjusted so as to give an identical suction on each fire. Despite this, a tendency for the combustion to proceed at irregular rates has been noticed. The charging of the burners has to follow a distinct order before the variation of the composition of the gas entering the converter can be reduced to less than 0·5 per cent.

Where pyrites is used in the production of burner gases for the contact process, air drying towers are employed in the Mannheim plant. The object of this is to maintain the concentration of the acid produced in the first portion of the process, after the iron oxide contact shafts, as high as possible. On the contrary, in the Tentelew system, burner gases are cooled to the temperature of filtration by passage into a leaden gas cooler of special design, surrounded by water, and then freed of the greater part of the residual acid and solid matter by passing through quartz filters. The formation of slag in mechanical pyrites burners is attributed to excessive temperature and to the fineness of the ore.

In view of the development at Avonmouth, of which a good deal has been heard lately, the observation made, that it is open to doubt whether the purification arrangement provided by Grillo plants will prove equal to the task of dealing with the impurities generated from zinc blende, is of significance. Moreover, it is remarked, anent the question whether the sulphur burners of Grillo plants can be replaced by pyrites kilns, that sufficient data are available to show that purification is generally less perfect than such a transition would warrant, and that in the opinion of many who are competent to judge the structural changes required would be considerable.

Cooling of Burner Gases

Various types of cooling devices are described. No one can cavil about the paucity of information, either descriptive or other, on this or any other phase of the contact process. The treatment generally is singularly complete.

The removal of mist from the burner gas is rendered much more difficult if it is cooled quickly. Lead is the only metal with which the condensed acid should come into contact, and as lead will not withstand a high temperature and retain its shape, the cooling is in most cases fairly sudden for at least a fraction of the required fall in temperature. In some plants lead pipes are built up horizontally and immersed in water. In others, as for example the Grillo, vertical pipes are used and are water-sprayed. Steel pipes lined with tiles set in acid-proof cement have been used at some works, because the first lead pipes have either collapsed by reason of the high temperatures, or otherwise the action of hot concentrated acid has been sufficiently severe to involve the necessity for renewal.

The hot gas may also be cooled by bringing it directly into contact with dilute sulphuric acid, or even with water. Under such conditions the gas passes forward at a lower temperature. Rabe worked out a mode of cooling of the latter order, as part of a system for the purification of the burner gases. In one of the Herreshof patents, after leaving the dust chamber, the gas passes to three towers, which are irrigated with weak sulphuric acid from the scrubbers of the

* *The Manufacture of Sulphuric Acid* (*Contact Process*). By F. D. Miles, M.Sc., A.R.C.S., F.I.C. (Lunge and Cumming, Vol. IV.). London: Gurney and Jackson. Pp. xv, 427. 36s.

purification system. Where towers are used with a sulphuric acid feed, it is found that the higher the temperature at which the gas enters the system the greater is the amount of mist which passes away from it. Where heat is removed for the concentration of weak sulphuric acid, it will be found that an additional burden is transmitted to the drying system of the plant, unless special steps are taken to remove the additional water vapour.

Gas Filtration

One is now led to the unit process of gas filtration, and here it is found that many substances have been used as filtering materials, although coke and quartz are the most common. Where the conditions of use, as in the case of the Grillo plant, are such that only traces of acid are to be removed, coke undoubtedly exposes a larger surface than silica, the use of which has been suggested for this purpose.

The size, construction, and method of filling filters vary considerably. There are so many variable factors that no general figures for the efficiency of quartz or coke filters can be given. A broad difference may be made between filtration intended to remove the coarser particles of acid from the burner gases and the finer filtration which aims at the removal of the entrained acid mist after scrubbing and drying.

In the Grillo plants of H.M. factories, two filters connected in series between the gas coolers and the scrubbers were provided, each being 30 ft. long, 12 ft. wide, and 10 ft. deep, and usually containing, irrespective of the coarse material, 4 ft. of crushed coke of a size from one-eighth to three-sixteenths of an inch. On these plants, basing on a daily plant capacity of 22·5 tons of trioxide, the burner conversion averaged about 2·5 per cent., representing about 0·56 ton of trioxide per day, which had to be removed by purification. Sixty to 70 per cent. was removed by the two filters in question. For every ton of trioxide made about 130 cubic ft. of fine coke was provided.

The method of passing the gas through the filters can be varied, but where deposition of dust or sublimation of sulphur from sulphur burners is anticipated, downward filtration in the first two filters is desirable, so that the contaminated material can be replaced without much difficulty. Other types of filter have been used in the United States, and filters arranged in parallel are adopted on the Tentelew and other plants for initial purification.

Scrubbing

Different methods can be applied for the scrubbing of burner gas, but, broadly speaking, these fall into two categories: (*a*) contact of gas and liquid *viâ* a wetted surface, and (*b*) intimate contact resulting from the bubbling of the gas through the liquid. The latter class of operation is much more efficient than the former, although it is likely to involve more power. Mechanical scrubbing with the Theisen centrifugal scrubber, such as is used for cleaning blast furnace gas from dust, or the Tripex washer, has frequently been discussed.

The removal of fine dust does not constitute any serious problem; what is more difficult is the elimination of sulphuric acid mist. The particles settle with difficulty, even when diluted by the presence of a large amount of water vapour, which should aid deposition.

The scrubbing media in use are water, dilute sulphuric acid, and very dilute alkaline solutions. Obviously, there is a limit to the quantity of water that can be used, if loss of sulphur dioxide is to be obviated. In the absence of considerable quantities of hydrochloric acid, dilute acid alone is efficient in the removal of most of the impurities. In the Tentelew process a dilute solution of sodium hydroxide is satisfactory for the elimination of hydrochloric acid, and is one of the best means of purification. Where three scrubbing towers are used it was usual to maintain the acid in the last tower at 93 to 95 per cent., in the second at 84 to 85 per cent. and in the third at 55 to 60 per cent. In the last case water was added if necessary. Large feeds of acid up to 10 tons per hour were discharged to each tower. The efficiency of a scrubbing system to remove chlorine depends entirely on working the initial scrubber with as weak acid as possible, and renewing it when a certain impurity concentration is reached.

The total amount of acid and water vapour passing from these towers varies greatly. Amounts of 0·5 gram per cubic metre of H_2SO_4 are not unusual, accompanied by 0·2 gram or more of water. When the maximum production was reached in some cases the total moisture equalled 1·0 gram or more. The extent of the scrubbing space provided was 346 cubic feet per ton of trioxide made.

At the Badische works gas washers are used, somewhat resembling a certain type of sulphate of ammonia saturator. Intensive washing with sulphuric acid is the dominant aim. They are very efficient as contrasted with packed towers and lend themselves more readily to control of the temperature of the acid. But the disadvantage accompanying their use has already been referred to, viz., the power required for operation.

Gas Drying

The drying of the purified gases is effected by passing them through packed towers irrigated with sulphuric acid. Coke is invariably used as the packing material. Usually two towers, and often three, are employed. Where such towers have to fulfil the double *rôle* of scrubbers and driers the acid circulation must follow the order described earlier, as the amount of water removed from the gas may be an important factor in the operation of the plant.

Mr. Miles points out that "it is not possible to state the degree to which drying of gas over sulphuric acid, say, of 94 per cent., can be carried at a given temperature in the ideal case, because the very small vapour tension of water over acid of this strength has not been determined, but in practice well-dried gas does not contain more than 0·02 to 0·7 gram of water per cubic metre."

The purity of the drying acid is of the greatest importance. Small particles are entrained by reason of the inevitable splashing and flow of the acid. Unless precautions are taken these may find their way to the converters, possibly carrying arsenic with them. Periodical tests for arsenic must be applied to the acid. As already observed, the gas leaving the drying towers should pass through filters for the removal of the spray produced in the towers.

The solubility of SO_3 in sulphuric acid is considerable, especially when the acid contains less or much more than 84 per cent. H_2SO_4. The upper and lower stock tanks should be covered in order to reduce the loss at this point.

Preheating

The gas entering the converter must be raised to the requisite temperature. There are three sources from which the heat can be derived: (1) The gas may pass through a preheater in which coal or coke is burned, but with a modern plant there is no need for the consumption of any fuel at all, except when starting a plant with the contact mass cold; (2) the heat of reaction may be transferred from the gas leaving the converter to that entering it: or (3) the heat of combustion of the pyrites or sulphur may be transferred in a similar manner.

Cast iron U-shaped tubes from 7 to 8 ft. long, with an inside diameter of 4 to 6 in., are largely used. The thickness of the wall is from ¾ to 1 in. It is usual to stagger the pipes in order to secure a greater heating effect. A counter-current flow is also arranged, the cold gas passing through the pipes in contrary direction to the flow of the hot gases on the outside of the pipes. The purified dried gas undergoing preheating is under pressure, while the burner gas is under slight suction. Thus, if a fracture develops in one of the pipes it is impossible for the impure burner gas to enter and contaminate the purified gas. When coal or coke is employed the thermal efficiency is notoriously low. Oil firing is said to be more efficient.

To afford an idea of the extent to which provision has to be made for preheating on three types of plant, Mr. Miles furnishes the following figures, which relate in each case to the external heating area of the preheater:—

Plant.	Approximate Production. Tons SO_2 per day.	Exposed Preheating Area.
Grillo	22·5	2880
Tentelew	11·0	1000
Mannheim	5·0	80

Heat Exchangers

Tubular heat exchangers are always used when a recovery of heat from the gas emerging from the converter is effected by that entering it. Steel tubes, expanded into two internal tube plates contained in a cylindrical case, broadly represent

the form of the apparatus. Two baffle plates are used, so that the best advantage is taken of the heating surface of the tubes. Theoretically, if a heat exchanger were very long and operated on the counter-current system, all the heat which were the first gas stream had in excess of the second should be transferred to the second in one passage through the apparatus. In practice, however, owing to the limitations imposed by size and cost, the cold gas becomes heated to a temperature which is about the mean of the two initial temperatures.

For regenerative operation, Mr. Miles outlines the requirements thus:—"(1) Very efficient heat insulation; (2) efficient heat exchange; and (3) fairly high sulphur dioxide concentration;" he adds that "of all types of plant which are known to be operated in this country the Tentelew is the only one which works without either consumption of fuel or the utilisation of the heat of the burner gas."

Catalysis

To give even a brief summary of this aspect would be impossible. Mr. Miles observes that the selection of a catalyst for a given chemical reaction has been, and still is, mainly empirical. At the moment trial alone will reveal what is needed. Signs, however, are not wanting to show that general principles may emerge from the mass of facts to form a guide to the applicability of catalysts. The physical phenomena which accompany catalysts at solid surfaces are becoming more widely known.

A survey follows of the physical phenomena of catalysis, in which the physical condition of the catalyst, the influence of water vapour, and the poisoning of catalysts are dealt with. It is remarked that platinum is extremely sensitive to the action of certain substances, very small amounts of which seriously impair its activity or suppress it altogether. The most dangerous and frequent poison is arsenic. Its action is to a great extent permanent. Chlorine, iodine, hydrochloric acid, silicon tetrachloride, sulphur and lead sulphate have each an adverse action, but, strictly speaking, one cannot regard all these substances as poisons.

There are two ways in which the activity of a catalyst may be reduced—(1) by the access of a substance which has a specific poisoning action and (2) by a deposit of solid matter on the catalyst, which hinders the diffusion of the reacting gases to its surface. It is usual to have 30 tons of ferric oxide to 4 or 5 lb. of platinum. The residue from the burning of pyrites or ferric oxide obtained by heating hydroxide has been found to be more efficient than that made by the ignition of either of the sulphates of iron.

The Höchst works investigated the possibility of utilising vanadium compounds in their preliminary work about 1900, and found that these substances and tungsten trioxide acted about equally well and are better than molybdenum trioxide. Moreover, they are superior to those containing iron oxide. In connection with one Grillo unit, H.M. Factories, 55 lb. of platinum was used to deal with 1,680 lb. of SO_2 per hour, representing 30·5 lb. SO_2 per lb. of platinum per hour. The average percentage of platinum in the contact mass was 0·31. Many substances have been proposed as catalyst carriers, but two only appear to have survived the test of experience—viz., asbestos and magnesium sulphate. A greater surface is presented by a given weight of asbestos than by the same weight of any other available material. The proportion of platinum which can safely be deposited on the fibre is much higher than in other cases. It is not unusual to employ 10 per cent. In Tentelew converters in this country, 7 to 10 per cent. has been used. A first and second calcination of magnesium sulphate is necessary if the required hardness and resistance are to be obtained. Detailed instructions are given concerning the production of the magnesium sulphate mass and its platinisation, and these should be consulted. To recover platinum from magnesium sulphate mass is obviously much more easy than its recovery from the asbestos contact mats. Before making use of contact mass on a large scale it is advisable to make a preliminary test, to ensure that the desired conversion will be attained.

Converters with and without internal regeneration are fully described and illustrated and much interesting information is furnished concerning conversion in dual converters in series. The kinetics of conversion are the subject of full treatment under the chapter dealing with Gas-Repeat Equilibrium and Velocity of Reaction. At ordinary temperature, and at any pressure, sulphur dioxide and oxygen are entirely without action on one another. An increase of temperature does not alone produce any direct action. The whole technical possibilities of the direct combination of these two gases lie in the influence which is exerted on them by solid substances. Platinum has been found to act with a rapidity unsurpassed by that of any other substance. To paraphrase Ostwald's words, all that a catalyst can do is to increase the velocity with which a given reaction attains its state of equilibrium.

Gas Equilibrium

Reaction between gases does not usually proceed to completion. A point is reached beyond which combination cannot go, some of the original gases being still uncombined. The condition of equilibrium may be regarded as the balance of two opposing reactions. One can imagine that a catalyst which promotes combination between two gases initially would have a corresponding tendency to dissociate the resulting compound into its components. Knietsch demonstrated that this actually occurred.

All Mr. Miles's observations relating to gas equilibrium need to be carefully studied, as he covers fundamental principles in a really sound way. Taking as a premise that equilibrium is attained by balancing opposing reactions, he expresses the statement symbolically thus:

$$2SO_2 + O_2 \rightleftharpoons 2SO_3$$

and proceeds to observe that "the reaction from left to right gives out heat. Suppose now that a mixture of all three gases in equilibrium is raised in temperature. In accordance with the Principle of Movable Equilibrium the system will adjust itself in such a way as to tend to neutralise the imposed change. In this case the tendency will be to absorb heat, which can occur only by sulphur trioxide dissociating. Increase of temperature has thus established a new state of equilibrium, in which the yield of trioxide is less than before. From this elementary reasoning the fundamental problem of the contact reaction appears at once. The higher the temperature the worse the yield. Good yields are therefore attainable in proportion to the activity of the catalyst, for the more active the catalyst the lower its working temperature."

Space precludes one from considering this aspect further, interesting as it undoubtedly is. Respecting equilibrium constants and yields at various temperatures, Mr. Miles gives very valuable data, as also concerning the influence of oxygen content in increasing the conversion yield.

Absorption

Of the total gas volume passing to the absorption plant from 5 to 8 per cent. consists of trioxide. Direct absorption in water is practically impossible, as the acid mist thus formed resists the most vigorous scrubbing. Acid of about 98 per cent. H_2SO_4 is the best absorbent, and is rapid and complete in action, provided its concentration is maintained. The temperature of absorption is also an important factor; the heat development due to the combination of sulphur trioxide with water or with sulphuric acid is appreciable, and needs to be contemplated. Obviously, absorption ceases when the vapour pressure of the trioxide in the oleum equals that of the partial pressure of the trioxide in the gas. As temperature determines the vapour pressure of the acid, the operations of absorption, generally speaking, are governed by this factor.

The number of absorbers required, and the method of connecting them, depends on the size of the plant, the nature of the acid being made, the efficiency of the coolers, and the strength of the feed. Interesting particulars are furnished of an absorption system consisting of three towers for making 20 per cent. oleum with two circulating acids. Indeed, the system consists of two parts, the oleum section and the 98 per cent. acid section. It has been found advantageous to construct in steel the connecting pipes and the large coolers which are necessary for heavy loads, in the first section, and to use cast iron for the corresponding parts of the second—the 98 per cent.—section. Cast iron cannot be used for oleum without cracking, but resists concentrated acid better than steel if the temperature does not become too high.

Having made a few observations on each of the unit processes involved in the production of oleum, all of which are adequately dealt with by the author in the book under notice, it only remains to say that the volume comprises ten chapters. Every chapter contains evidence of the ripe knowledge which Mr. Miles has brought to bear upon a subject which he has made peculiarly his own.

Non-Corrodible and Non-Scaling Steels

Interesting Exhibits at the Royal Society

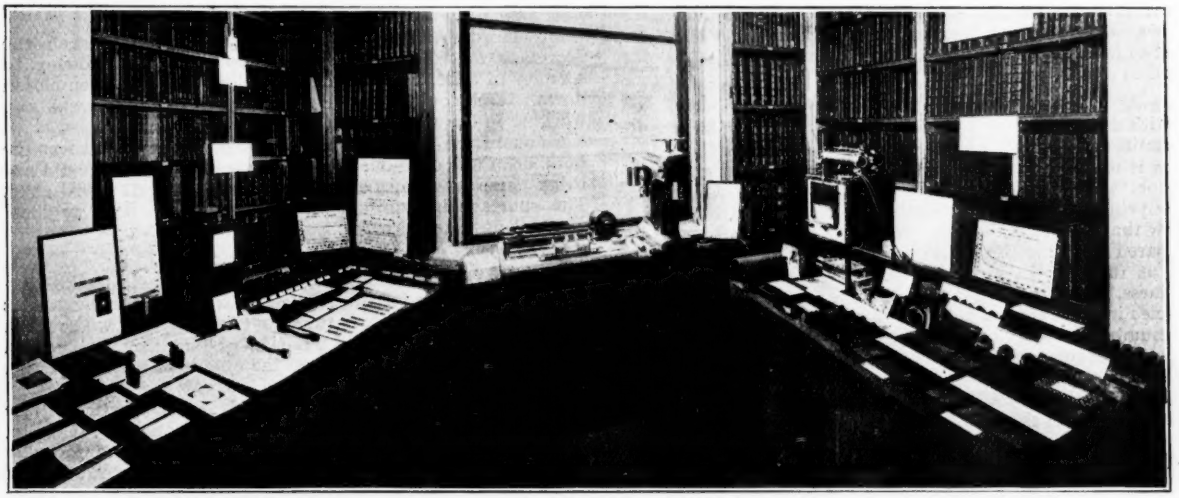
DURING the recent tour of the American Chemical Engineers in this country, the programme included a demonstration by Sir Robert Hadfield, F.R.S., of the metallurgical exhibits which he had prepared for the conversazione of the Royal Society, held on the 250th anniversary of the founding of the Royal Observatory at Greenwich. The specimens prepared in their research laboratory by his firm, Messrs. Hadfields of Sheffield, were numerous, as will be seen in the accompanying photograph of Sir Robert's exhibits which were on view at Burlington House.

Among the specimens of non-corrodible steel on view were some of the alloys, known as "Hecla/A.T.V.," which are the joint production of Messrs. Hadfields, of Sheffield, and the Société Anonyme de Commentry, Fourchambault et Decazeville, whose Imphy works were mentioned by Réaumur so far back as 1722, his words being "one of the small forges at Imphy in the Nivernois. These are people on whose accuracy I can rely." The development of these alloys is largely due to Monsieur Chevenard, the well-known French metallurgist. Interesting specimens were shown of iron-nickel-chromium alloys demonstrating their resistance to corrosion of the atmosphere, tap water, sea water and the steam from simmering sea water, in comparison with a series commencing with wrought iron and including 12 per cent. chromium steel. Specimens illustrating further the nature of the progress of researches on corrosion included non-rusting chromium steel, which represents a distinct advance in the direction of obtaining non-corrodible steel, but has not proved a complete solution of the problem on account of the fact that its non-corrodible qualities are dependent upon heat treatment and the preparation of a smooth surface. A marked advance on this steel is obtained in "Hecla/A.T.V." steel and "Era/A.T.V." steel, which are highly resistant to a large range of corroding agencies, including the atmosphere, both at ordinary and high temperatures up to a red heat. They do not depend for their qualities upon heat treatment or special preparation of their surfaces. Photomicrographs of structure, and heating and cooling curves showed the entire absence of critical points in these alloys.

The exhibits of "Hecla/A.T.V." steel products included a turbine rotor blade, showing the attachment to the wheel by brazing and to the shroud by riveting. The possibility of attachment of the blading to the rotor by brazing facilitates turbine construction, and is easily accomplished with this steel, which suffers no deterioration of its qualities through high local heating and rapid subsequent cooling, nor is its composition affected by intermingling with the spelter used. In order to test the claims made for this steel, blades made of it were placed at four points 90 degrees apart round the periphery of each diaphragm of an experimental turbine, the remaining blades being of the usual 5 per cent. nickel steel. This spacing of the blades was adopted so as to ensure their not occupying specially favourable positions in comparison with the remaining blades. The operating conditions of the turbine were arranged to be as severe as possible, with frequent starting and stopping, and on opening it for inspection after it had been in operation for some four months daily the blades were found to show no deterioration, the surfaces being as smooth as they were when new. The condition of the rest of the blading did not compare with that of the special steel.

At a large generating station on the Mediterranean coast the blades used to last four to five years, but before mechanical considerations necessitated the removal of blades, wear on the edges and deep pitting seriously interfered with the working of the turbines. This station contains four turbo-alternators, namely, two 3,550 h.p. and two 2,400 h.p., and its working is essentially discontinuous by reason of its being connected with the large hydro-electric system in the district. Restartings are, therefore, extremely numerous. As a result of the condition of the blades seen on their first examination it was decided that trials of new metals were necessary. The problem was of special importance as regards the guide blades. These are cast into the discs, and when the blades are perforated the discs have to be completely replaced. The rapidity with which a directing ring becomes perforated is well known, and when this happens the steam passing through the hole perforates the next blade, and so on, and the ring is destroyed in a very short time. The re-blading of the runners is, on the contrary, much more convenient and less costly. The first trials were carried out on the directing rings near the region of atmospheric pressure of the two turbines of 2,400 h.p., and these rings in "A.T.V." have been in position and service since August, 1920. The use of this material appears, therefore, to be fully justified in spite of the higher original cost.

This exhibition of metallurgical specimens was of such interest both to members of the Royal Society and to the American engineers, that it is hoped a wider circle will have the opportunity of inspecting it. It is understood that Sir Robert Hadfield has consented to display his specimens at the Imperial College of Science and Technology, probably in the autumn, and large numbers should then take the opportunity to view these remarkable non-corrodible and non-scaling steels.



SIR ROBERT HADFIELD'S DISPLAY AT BURLINGTON HOUSE

Textile Dyeing Prices

Piece Dyers' Reply to Merchant Shippers

At a recent meeting of the Committee on Industry and Trade, evidence was given by witnesses representing the Piece Dyers' Association. The witnesses stated that the association was the outcome of acute price cutting, which had obtained to such an extent that businesses were conducted on the lowest possible margin of profit, or even at an actual loss. Firms in the trade were thus driven to co-operate to prevent individual disaster or collective impoverishment. The association had had a marked effect on the general efficiency of the dyeing trade, and the intercourse between members had been of benefit to the consumer, inasmuch as it had synchronised with a higher quality of the finished article. Competition for orders remained keen, but its basis was quality and service rather than price.

The witnesses referred to the evidence given before the committee some time ago by the Shipping Merchants' Committee, to the effect that the prices charged by dyers are operating to divert business into the hands of foreign competitors; and they urged that the contention was disproved by considering that in the years 1912 and 1913 the percentage of piece-dyed to the total linear yardage of grey and piece-dyed goods exported was 32·5 and 32·8 respectively, whereas in 1923 the corresponding percentage was 40·2, and in 1924 (making suitable provision for conversion from square to linear yardage) the percentage was 37·7. As the percentage of piece-dyed to grey has advanced above pre-war, it was surely illogical to attribute the lack of yardage in our export trade to dyeing prices.

Output the Basis of Prosperity

With regard to the assertion of the Shipping Merchants' Committee that the "underlying policy of price fixing federations is to make sure of profits and let output and the future prospects of the trade come second," the witnesses claimed that the dyeing trade was sufficiently alive to its own interests to know that output is the basis of its prosperity, and it was not prepared to jeopardise its prospects by taking such an undue toll as further to restrict the present diminished volume of business. In reference to allegations of monopolistic tendencies in the finishing trades, the witnesses pointed out that the number of dyeing and finishing firms who were not members of the Association has always been sufficient to check any such tendency.

In the matter of continental competition the witnesses submitted figures to show that in France there had been an actual decrease in the export of dyed goods compared with pre-war, while in the case of Switzerland the percentage was stationary. It was admitted that, as in 1913, Italy remains a very serious competitor in the matter of dyed goods, but it was submitted that the circumstances which have tended to encourage competition from both Italy and Belgium are such as to render the British dyeing trade incapable of meeting them with any degree of success. Among those circumstances the witnesses placed lower production costs, due to lower wage scales than those operating in this country, longer hours, cheaper dyewares, and lighter taxation. Further, it was urged that to the extent to which other countries fail to meet their war debt obligations to us, while at the same time we honour our own obligations, we are, in effect, subsidising the industries of those countries in competition with our own.

Reply to Merchant Shippers

Replying to the argument of the shipping merchants that the prices of finished goods have increased to a degree greatly exceeding the increase in the prices of unfinished goods, figures were given indicating that in 1924 the value of piece-dyed goods per unit was greater than in 1923, despite a reduction in dyeing charges of approximately 12½ per cent. This was explained by the fact that from causes which neither the dyeing trade nor the shipping merchants can control, the lower class of trade is leaving us, and that the higher qualities which are going out from this country to India, China, Egypt, and South America account for the increase in the value per unit, quite apart from pre-war and post-war costs.

The evidence concluded with the following submissions:—

(1) That the conclusions drawn by the Shipping Merchants' Committee, so far as the dyeing trade is concerned, are not justified.

(2) That having regard to production costs (particularly labour), to improved quality of product and better service, and to the welfare of the industry, dyeing charges are not unreasonable.

(3) That a reduction in dyeing and finishing charges in the present fluctuating condition of the raw cotton market would have no permanent effect in improving the cotton textile trade, but that stabilisation of raw cotton on a lower level of price would be of permanent benefit.

(4) That production costs in the dyeing industry would be reduced effectually by decreased taxation, brought about by reduced national expenditure and by an international settlement of war debt obligations.

(5) That owing to the absence of a free market in dyestuffs, prices both of British and foreign wares are maintained at an artificially high level, thus involving the colour-using industries in an increased cost in their raw materials to the extent of many hundreds of thousands of pounds sterling annually over and above the normal commodity price increase.

(6) That the cost of establishing the dyemaking industry in this country, necessary for both industrial and national security, is being borne entirely by the colour-using industries, whereas it should be a national charge.

Chemical Matters in Parliament

Metallurgical Coke Supplies

Mr. Hardie (House of Commons, August 5) asked the Secretary for Mines whether he was aware that, owing to scarcity of coke, blast furnaces at Moss Bay had been closed down; and could he give the number of coke ovens not working in Great Britain.

Colonel Lane-Fox said that he could not say what was the number of idle coke-ovens at the present time, but he did not think there was any general scarcity of metallurgical coke. The shortage in Cumberland appeared to be due to local disputes at the coal mines.

Lead in Paint Restrictions

Mr. H. Williams (House of Commons, August 6) asked the Secretary of State for the Home Department which countries had put into full operation the Convention of 1921 with regard to the use of lead in the painting of buildings, and which countries had legislated only to the extent of the Lead Paint (Protection against Poisoning) Bill, 1925.

The Secretary of State for the Home Department (Sir William Joynson-Hicks) said that four countries, namely, Austria, Czechoslovakia, Poland, and Sweden, had formally ratified the Convention, and taken legislative or other steps to give effect to it. He had no information as to countries with legislation on the lines of the Lead Paint Bill.

A Cocaine Substitute

Mr. Day (House of Commons, August 6) asked the Minister of Health if his attention had been drawn to the recent discovery by Dr. A. J. Copeland of a new anæsthetic which would serve as an alternative to cocaine; and if he had considered whether this new drug had any toxic properties which brought it within the scope of the Dangerous Drugs Act.

Sir W. Joynson-Hicks, who answered, said that he was not aware of any such discovery, but he recently made an investigation into the properties and effects of psicaine, a cocaine substitute prepared by German chemists, the results of which were published in the medical Press. A caution as to the supply and use of the drug has been issued through the pharmaceutical Press.

Iron and Steel Inquiry

Mr. Hannon (House of Commons, August 7) asked the Prime Minister whether he could make any statement in regard to the progress which had been made by the Committee of Inquiry now investigating the condition of the iron and steel industries.

The Prime Minister (Mr. Baldwin) regretted that he was not in a position to make any statement in regard to this investigation, and in reply to a further question by Mr. Dixey, asking when the report of the Research Committee on the Iron and Steel Trade would be forthcoming, said that it was a Committee of the Cabinet and would make its report to that body. It would be contrary to established practice to publish the report of a Cabinet Committee of this kind.

From Week to Week

THE BOARD OF THE BRADFORD DYER'S ASSOCIATION, LTD., announce the purchase of the cotton-piece dyeing business of Robert Clay, Ltd., Cheadle.

LORD RAYLEIGH, formerly professor of physics at Imperial College, South Kensington, and an authority on radium and helium, has been appointed a member of the committee to inquire into the future of broadcasting.

IN RESPONSE TO EARL HAIG'S APPEAL of August 4 for the British Legion, which was published in THE CHEMICAL AGE last week, it is announced that donations amounting to £1,780 were received, bringing the total up to £12,000.

SIR ERNEST AND LADY RUTHERFORD have left England for Adelaide, and hope to return early in 1926. The visit is a private one, but Sir Ernest will deliver lectures on aspects of modern physics while in Australia and New Zealand.

AMERICA'S RUBBER SUPPLIES are the subject of the Commerce Department's report on a survey lasting eight months, which estimates that 70,000 tons of rubber could be produced in the Philippines annually, and it would be possible to affect the British control of supply.

CONCRETE BUILDING is the subject of a competition, initiated by Mr. Neville Chamberlain, in order to encourage the discovery of ways of applying shuttering to the making of concrete walls. Models of methods of building concrete houses cheaply and quickly are now being received at the Ministry of Health.

THE RUSSIAN GOVERNMENT'S buying agents have just placed with the London office of a Liverpool firm a large order for resin and other manufacturers' materials. Their sole condition was that the goods should be of British manufacture and best quality. They paid the best prices and spot cash was deposited on each order.

MR. HENRY FORD, the motor magnate, has obtained complete control of the Stout Metal Aeroplane Co., and will operate the plant henceforth as part of the Ford Motor Co. It is understood that he will enlarge the plant at once in order that within the year he may possess at least 100 aeroplanes on the company's service between the manufacturing and assembling plants.

GERMAN REPARATION PAYMENTS during the first nine months of operation of the Dawes plan, ended May 31, 1925, amounted to 740,125,077 gold marks. The schedule of payments calls for 1,000,000,000 gold marks in the first year. The results for three quarters of the first year, therefore, are almost exactly in line with the schedule of payments, although a large part of the payments so far made have come from the gold mark German loan.

A SURPRISE FOR THE IRONWORKERS of Lysaght's Mills, Newport, was afforded on Tuesday when The Hon. James J. Davies, Labour Minister of the United States of America, who was visiting the mills, picked up a pair of tongs and performed work in an expert way, before they were aware he had worked in an ironworks before taking office. The men cheered him when leaving. Mr. Davis also descended the Markham Colliery in Sirhowy Valley, which is worked wholly by electricity, where he cut some coal himself.

MR. A. M. HEDLEY, who was chosen as President of the North of England Institute of Mining and Mechanical Engineers at the annual meeting at Newcastle, comes from Eston, near Middlesbrough, and during the last 13 years has managed a group of ironstone mines belonging to Bolckow, Vaughan and Co., in the Cleveland District of North Yorkshire. The annual report presented by the secretary, Professor Henry Louis, recorded the fact that 54 new members had been enrolled during the year. The "George May" prize has been awarded to Mr. H. R. Houston and an Institute prize to Mr. Robert Williams, B.Sc.

SYNTHETIC PETROL is to be marketed in the U.S.A., according to a report from Detroit. The experts of General Motors have co-operated with the chemists of the Standard Oil Co. in the development of a new motor spirit which will be marketed under the name of Snynthol, and it consists of oil, coal, and lignite, and several varieties of alcohol. It is similar to tetraethyl (which has been prohibited in the U.S.), but is not poisonous. A new motor engine, designed for this fuel, is said to resemble more a steam engine than an internal combustion engine, and it is also claimed that trouble will never occur through carbon deposits.

THE FOLLOWING AWARDS for the year 1925–26 have been made by the Salters' Institute of Industrial Chemistry and approved by the Court of the company: Fellowships have been renewed to Mr. H. H. Evers, University of Liverpool, Fellow 1924–25; Mr. K. Knight Law, University College, Nottingham, Fellow 1924–25; Mr. H. S. Pink, University College, Nottingham, and University of Oxford, Fellow 1924–25; and Mr. V. E. Yarsley, Birmingham University, Fellow 1924–25. Fellowships have been awarded to Dr. R. Campbell, Armstrong College, Newcastle-upon-Tyne, and University of Oxford, and Mr. R. O. Gibson, University College, London. The Salters' Institute has also awarded 70 grants in aid to young men employed in chemical works in or near London to facilitate their further studies.

A NEW GLASS WORKS at Zeebrugge will begin production shortly. Some 3,000 workmen will be employed, and an industrial town has been built to accommodate them.

MR. GEORGE MARGERISON, of Hill Crest, Kidderminster, the chairman of Joshua Margerison and Son, Ltd., of Preston, soap manufacturers, who died on May 18, left £24,541, with net personalty £20,819.

COAL WILL BE HEWN by Mr. Runciman and other members of the Parliamentary Radical Group, who have arranged to go down two coal mines during the recess to investigate the working conditions. They will also visit the miners' dwellings.

RECENT WILLS INCLUDE: Mr. W. C. Beetham, of Charlton Kings, Gloucestershire, chemical manufacturer, £24,094, net personalty £14,727; Dr. George Clarke, director of John Clarke and Co., Ltd., wholesale chemists, Belfast, £11,620.

THE BELGIAN METAL WORKERS' STRIKE is to continue, as the union has rejected the compromise for the reducton of wages suggested by the Labour Ministry. The employers state that they have gone to the extreme limit of concessions. The proposal involved a 2½ per cent. reduction in wages, a cost of living bonus, and no victimisation.

ARTIFICIAL SILK WILL BE MADE by an American company, according to a report from New York. The Klis Rayon Corporation has been established, with a capital of $6,000,000, for manufacture under German patents, and has acquired the works of the Founders Silk Syndicate in Canton, Mass. It is expected that the daily production of artificial silk yarn will reach a ton a day.

GERMAN ANILINE DYE WORKS are reported at present as only employed to 50 per cent. of their pre-war capacity, and that the export trade is still unsatisfactory. The Chinese market, one of the most important, is practically dead, and difficulties with Japan have not yet been overcome. Russian purchases continue but have by no means reached the pre-war standard.

FOR ATTEMPTING TO OBTAIN his firm's secrets William Barry, chemist, Shelley House, Oakley Street, Chelsea, was fined £25 under the Bribery and Corruption Act, at Aberdeen. Barry secured an appointment as chemist with the Aberdeen Combworks Company, but his engagement was terminated in July. He pleaded guilty to corruptly offering 10s. to a caretaker, with a view to gaining admission to the factory.

STEEL HOUSES FOR DUNDEE have been voted by the Housing Committee of the Town Council, who recommended by 9 votes to 6 the erection of 20 steel houses of the Atholl type. The Scottish Board of Health stated that although the cost of each steel house was given at £466 6s., and was higher than the Board would approve for general adoption, they were prepared to consider carefully the erection of a number of Atholl steel houses at that price. If the application was approved assistance would be given either under the 1923 or 1924 Acts as the Corporation might desire.

Obituary

MR. CHARLES WILLIAM HAROLD HOWSON, 34, analytical chemist, of Norfolk Road, Erdington, Birmingham, drowned while bathing at Whitby. He was a rubber chemist in the laboratories of the Dunlop Rubber Co., at Birmingham, and had been on the staff of Dr. Twiss for some years.

THE death took place on Saturday, August 1, at his residence, 20, Hillview, Blackhall, Edinburgh, of Mr. DANIEL RANKIN STEUART, F.I.C., F.C.S., late chief chemist of the Broxburn Oil Co., Ltd. Mr. Steuart, who was a native of Bogside, Lanarkshire, and was 77 years of age, was well known in scientific circles, and was regarded as one of the greatest petroleum technologists. He studied chemistry under Professor Crum Brown, at Edinburgh University, and later pursued his studies in Glasgow and Munich. Resolving to devote himself to industrial chemistry, he worked under the late Sir George Beilby for a few years as oilworks chemist at Oakbank. In 1877 he was appointed chief chemist to the Broxburn Oil Co., Ltd., then newly established. In this capacity he remained for over 40 years and had a large part in developing the resources of the works at Broxburn. Mr. Steuart did much original work in connection with shale oil, and contributed papers on the subject to various learned societies, and articles to standard chemical dictionaries. He was an authority on "The Chemistry of the Oil Shales," and contributed an exhaustive treatise on "The Oil Shales of the Lothians," one of the memoirs of the Geological Survey, Scotland, in which he dealt with the treatment of shale after its extraction from the mine, the products obtained from it, and the statistics of the industry. In addition to being a Fellow of the Royal Society of Edinburgh and a Fellow of the Institute of Chemistry, he was a member of the Chemical Societies of both Great Britain and America. Some years ago Mr. Steuart made strenuous efforts to induce Parliament to prohibit the use of dangerous lamp oils, and though unsuccessful at that time, he lived to see the oils made safe through the extraction of the dangerous lighter fractions which are now so much required for motor spirit. Owing to failing health he retired from active work about five years ago.

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GENERAL.—Constitution of aromatic substances and their physical and chemical properties. Part II. I. A. Pastak. *J. Chim. Phys.*, June, 1925, pp. 264-279.

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OILS.—The transformation of mineral oils in colloidal systems. F. Evers. *Z. angew. Chem.*, July 30, 1925, pp. 659-662.

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CASEIN.—Analytical investigations of technical casein. H. Ulex. *Chem.-Zeit.*, August 6, 1925, pp. 641-642.

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COMBUSTION. The influence of trichloroethylene on the limits of inflammability of hydrogen-air mixtures. W. P. Jorissen and B. L. Ongkiehong. *Rec. Trav. Chim. Pays-Bas*, July, 1925, pp. 814-817.

Patent Literature

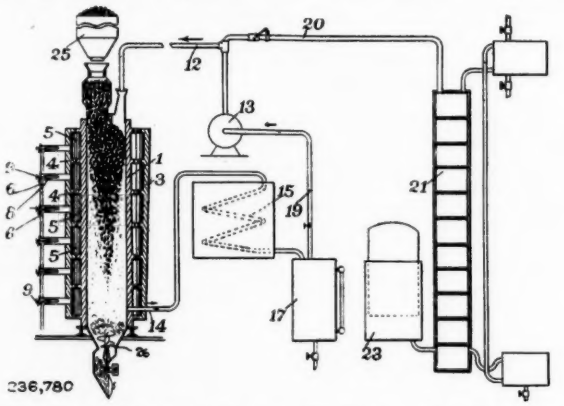
Abstracts of Complete Specifications

236,633. Coagulation of Rubber Latex, Process for. H. W. Hammond, 1, Lake Road, Slavè Island, Colombo, Ceylon. Application date, April 8, 1924.

This process for coagulating latex yields a product which is tougher, purer, and has greater tensile strength. The fresh latex is mixed with a saccharine solution and boiled until coagulation takes place. The coagulum is then cooled in water. The saccharine solution appears to combine with the latex and gives the rubber improved ageing qualities and more rapid vulcanising qualities than can be obtained by the usual acid coagulation. The saccharine substance may be ordinary cane sugar, and may be obtained from cane sugar molasses reduced to a specific gravity of 1·008 at 60° F., the solution being clarified by means of a precipitant and filtered. In an example, a mixture of latex 3 gallons, saccharine solution 13·5 ounces, and water 72 ounces, is boiled by superheated steam, yielding 9·5 lb. of rubber in nine minutes.

236,780. Total Gasification of Coal, Process for. H. Fairbrother, London. From Jackson Research Corporation, 37, West 44th Street, New York. Application date, October 13, 1924.

In this process, bituminous coal is completely gasified, leaving a residue only of ash. A vertical retort 1 is spaced



from an enclosing space 3 by annular ribs 4. The ribs form a series of annular chambers 5, each of which is provided with gas burners, comprising branch pipes 6 for gas, each having a regulating valve 9, and valve-controlled air pipes 8. The heat applied at different levels may thus be regulated as desired. The coal is fed into the upper end of the retort from a hopper 25, and the upper zone is heated to about 800° C. The distillate is forced downwards through the coal by a blower 13 to the lowest zone where the temperature is 1,600° C. The volatile products are cracked in the lowest zone, forming fixed gas, which is drawn through pipe 14 to the condenser 15, where any condensible vapour is removed. The condensate is separated from the fixed gas in the tank 17, and the gas passes through the pipe 19 to the blower 13, which delivers the main portion through pipe 20 to scrubber 21 and reservoir 23. Part of the gas returns through the pipe 12 to the top of the retort, and, together with the water vapour liberated in the upper part, completely gasifies the incandescent coke in the lower part. Water or steam may be added to the gas entering the top of the retort if necessary for combination with the carbon. This process renders it possible to use cannel coal which cannot be used for gas making by the ordinary processes.

236,795. Quinonoid Derivatives of 2 : 1-Naphtho-phenothiazine, Manufacture of. A. G. Bloxam, London. From Akt.-Ges. für Anilin Fabrikation, Berlin, S.O. 36. Application date, November 7, 1924.

This compound is made by the reduction of 2-oxy-3-(2¹-nitrophenyl-mercapto)-1 : 4-naphthoquinone and ring closure. The closure may occur during reduction or subsequently by acidification, according to the nature of the reducing agent used. The substitution derivatives of these naphthoquinones react in a similar manner. To obtain the 2-oxy-3-(2¹-nitrophenyl-mercapto)-1 : 4-naphthoquinone and its substitution products, a 2-arylamino- or 2-acidylamino-3-chloro-1 : 4-naphthoquinone or a sulphonic acid thereof is treated with 2-nitrothiophenol or a substitution product, and the product heated with strong alkali to exchange the substituted amino group for hydroxyl. The resulting naphthoquinone is an orange-red crystalline powder melting at 245° C. and dissolving in concentrated sulphuric acid and in alkalies to an orange yellow solution. Details are given of the treatment of 2-oxy-3-(2¹-nitrophenyl-mercapto)-1 : 4-naphthoquinone and several substitution products by this process.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention :—215,336 (H. Wolf) relating to conversion of high boiling hydrocarbons into lower boiling hydrocarbons, see Vol. XI, p. 46; 220,936 (Naamlooze Vennootschap Philips' Gloeilampenfabrieken) relating to separation of hafnium and zirconium, see Vol. XI, p. 450; 227,107 (W. Eberlein) relating to production of acid-resisting bodies, see Vol. XII, p. 233; 232,560 (Chemische Fabrik Griesheim Elektron) relating to drying calcium hypochlorite compounds, see Vol. XII, p. 641.

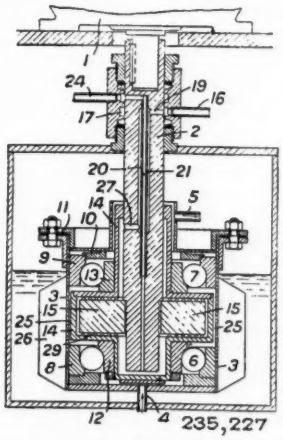
International Specifications not yet Accepted

235,217. Hafnium and Zirconium Compounds. Naamlooze Vennootschap Philips' Gloeilampenfabrieken, 6, Emmasingel, Eindhoven, Holland. International Convention date, June 6, 1924.

To separate hafnium and zirconium from a mixture of the phosphates, phosphites, arsenates, arsenites, antimonates or antimonites, the mixture is dissolved in oxalic acid, sulphuric acid, or phosphoric acid, and fractionally precipitated by diluting, heating, adding alcohol, hydrochloric acid, or an alkali. Alternatively, the original mixture in suspension may be fractionally dissolved in one of the above solvents.

235,227. Colloid Mills. Siemens and Halske Akt.-Ges., Siemensstadt, Berlin. International Convention date, June 7, 1924.

The mill casing 3 is immersed in cooling water, and contains ball bearings 6, 7, the inner races 12, 13 of which are rotated by the member 15 carried by a shaft 2. The outer races 8, 9 fit tightly against the casing, and are pressed towards one another by a diaphragm 10. The material to be treated is



supplied through a pipe 4 to the lower ball bearing, and then through a narrow space 25 to the upper bearing and the outlet 5. Cooling water is supplied by a pipe 16 to a passage 20, and thence to the space between shaft 2 and casing 14. The water then flows round the disc 15 and back by pipe 21 to outlet 24.

235,232. Indiarubber Compositions. American Rubber Co., 130, Essex Street, Boston, U.S.A. Assignees of M. C. Teague, 561, West 58th Street, New York. International Convention date, June 9, 1924.

Rubber latex compositions for extruding, spreading, etc., are obtained by adding a non-protein agent to thicken the aqueous phase, but without modifying the colloidal condition of the rubber. Suitable substances which react chemically

with the water-soluble constituents of the latex but do not attack the proteins are lead thiosulphate, basic lead acetate, lead acetate with a protective agent, litharge, lead hydroxide, red lead, the reaction products of lead oxides or salts and mono-, di-, and poly-saccharoses, lead chloride, bismuth hydrate, ferric oxide, ferrous lactate, basic ferric acetate, ferrous oxalate, stannous oxalate, cadmium sulphide. Alternatively, physically acting thickening agents such as ammonium or substituted ammonium soaps or saponification products, *e.g.*, those formed from acids of the stearic and oleic type or from cocoanut, cottonseed, palm, linseed, and corn oils may be used. In another modification, saponin may be used, up to 1 per cent. of the rubber content. Examples of these compositions for coating fabrics are given.

235,521. Ethyl Chloride. Chemische Fabriken vorm. Weiler-ter Meer, Uerdingen, Germany. International Convention date, June 12, 1924.

Ethylene and hydrogen chloride in equal parts are forced into an autoclave at −15° C. and a pressure of 60 atmospheres. An inert solvent such as ethyl chloride and an anhydrous chloride such as aluminium chloride or a double chloride of aluminum and ethylene should also be present. Ethyl chloride is produced, and part of it is boiled off at 20° C., the remainder being retained for the next operation.

235,540. Ketones and Dicarboxylic Acids. M. Naef et Cie., 1, Chemin des Melezes, Geneva, Switzerland. International Convention date, June 16, 1924.

The process is for preparing carbocyclic ketones having more than nine ring members. In one method, the thorium salt of a dicarboxylic acid, *e.g.*, tetradecane-1-14 dicarboxylic acid is heated above 400° C. in a vacuum and in the presence of copper or iron turnings as a heat conductor. The cyclic ketone, cyclopentadecanone is obtained from the distillate by fractionally distilling and then forming the semicarbazone. In another method, tetradecane-1-14-dicarboxylic acid is heated alone or with thorium oxide to 400° C. to obtain cyclopentadecanone. The cyclic ketones can be oxidised with chromic acid to obtain dicarboxylic acids. The preparation of ketones from cyclodecanone to cyclooctadecanone is described.

235,547. Alkyl Chlorides. T. Goldschmidt Akt.-Ges., 18, Salkenbergsweg, Essen, Germany. International Convention date, June 10, 1924.

Alkyl chlorides, except ethyl chlorides, are obtained by treating gases containing the lower olefines with hydrochloric acid in the presence of iron oxide or chloride in a solid state or in solution or suspension. Ethylene is not attacked under these conditions. In an example, a gas containing ethylene, propylene, butylene, and methane is mixed with hydrochloric acid and passed over iron chloride at ordinary temperature. A mixture of propyl and butyl chlorides is obtained by cooling to −60° C.

235,548. Chromates. J. Mayer und Sohn, Leather Works, Offenbach-on-Main, Germany. International Convention date, June 16, 1924.

Waste chrome leather is heated with barium peroxide in an autoclave, yielding barium chromate and sulphate. These are separated from the glue liquor, and treated with sodium bisulphate or sulphate, or with sodium sulphate and sulphuric or hydrochloric acid, to obtain sodium chromate. Sodium chromate can also be obtained from waste chrome tanning liquor by treating with a barium, lead, or strontium salt to obtain an insoluble chromate, which is then treated as above.

235,552. Ammonium Chloride and Alkali Sulphate. Continentale Akt.-Ges. für Chemie, 59, Augsburger Strasse, Berlin. International Convention date, June 11, 1924.

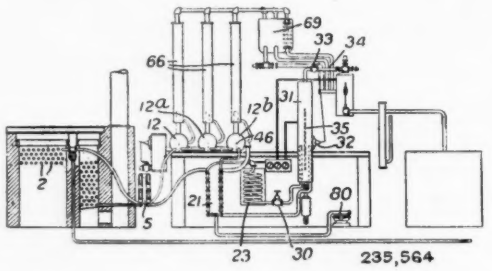
A mixture of sodium or potassium chloride, ammonium sulphate, and a small quantity of sodium peroxide, or alkali nitrate, chlorate, persulphate or hypochlorite is first dried by heating and then strongly heated. Oxidising gases are liberated, and pure ammonium chloride is sublimed, leaving calcined sodium sulphate. Alternatively, an oxidising gas such as oxygen or chlorine may be passed over the heated mixture of alkali chloride and ammonium sulphate.

235,556. Dyes. Akt.-Ges. für Anilin Fabrikation, Treptow, Berlin. International Convention date, June 14, 1924.

In obtaining sulphuretted dyes, the sulphurisation is effected in presence of a complex copper compound which is not converted into copper sulphide. The leuco-indophenol obtained from 1-phenylamino-naphthalene-8-sulphonic acid and *p*-aminophenol is refluxed with sodium sulphide, sulphur, and potassium cuprocyanide, yielding a dyestuff which gives yellow-green shades on cotton. Another example is given of a dyestuff obtained from 3-amino-6-oxydiphenazine.

235,564. Cracking Hydrocarbons. Motor Fuel Corporation, Franklin, Pa., U.S.A. Assignees of C. F. Richey and P. Y. Duffee, Franklin, Pa., U.S.A. International Convention date, June 16, 1924.

Fuel oil or kerosene distillate is heated to cracking temperature while maintaining the liquid phase under pressure, and then distilled. The oil passes through a pump 80 to heat



exchangers 21, 5 and then through tubes 2 heated in a furnace to 850°–950° F. under a pressure of 600 lb. per sq. in. The oil is then cooled by passing back through exchanger 5, heating coils in stills 12, 12*a*, 12*b*, exchanger 21, and a water-cooled coil 23. The oil then passes through a pressure reducing valve 30 to chamber 31, from which permanent gases pass by pipe 34. The cooled oil is heated in the exchanger 21 and then passed through the stills, which are surmounted by dephlegmators 66 connected to a condenser 69.

235,584. Halogenated Alcohols. Farbenfabriken vorm. F. Bayer and Co., Leverkusen, near Cologne, Germany. Assignees of Dr. Schmitz and Co. Ges., 54, Himmelgeisterstrasse, Düsseldorf, Germany. International Convention date, June 12, 1924.

In an example of the process of producing halogenated alcohols from halogenated aldehydes, a solution of chloral or butylchloral in alcohol is boiled with aluminium ethylate, while hydrogen or nitrogen is passed through. The alcohol is distilled off, dilute sulphuric acid is added to the residue, and trichloroethyl alcohol or trichlorobutyl alcohol are obtained by steam distillation.

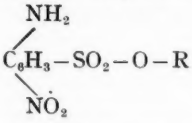
235,588. Fluorides, Alkali Carbonates and Hydrates. M. Buchner, 1, Schellingstrasse, Kleefeld, Hanover, Germany. International Convention date, June 14, 1924.

A fluoride such as sodium fluoride is treated with a carbonate or hydrate of a metal forming an insoluble fluoride, under heat and pressure, with a small quantity of water. Sodium carbonate and hydrate are obtained.

235,589. Synthetic Resins. British Thomson-Houston Co., Ltd., Crown House, Aldwych, London. Assignees of J. G. E. Wright, Alphaus, New York, and W. J. Bartlett, 1847, Stanwood Road, East Cleveland, Ohio, U.S.A. International Convention date, June 13, 1924.

The hardening of resins produced by the interaction of a polyhydric alcohol such as glycerine and a polybasic acid such as phthalic acid or anhydride, is stopped when the resin is just short of the intermediate condensation stage. The interruption is obtained by heating the fusible resin dispersed in a solvent of high boiling point to effect a partial curing. The resin is precipitated, *e.g.*, by pouring the solution in diethyl phthalate into benzene. The resin can be hardened by a short heating.

235,598. ARYLSULPHONIC ESTERS. Farbenfabriken vorm. F. Bayer and Co., Leverkusen, near Cologne, Germany. International Convention date, June 14, 1924.
Dyestuff intermediates of the general formula



where R is a radical of the benzene or naphthalene series, are obtained by condensing a nitrohalogen-benzene-sulphochloride with a phenol and replacing the halogen atom by the amino group. In an example, 4-nitro-1-aminobenzene-2-sulphonic acid phenyl or *o*-methoxy-phenyl ester is obtained from 4-nitro-1-chlorobenzene-2-sulphochloride and phenol or guaiacol, which are condensed and then heated with ammonia. In another example, 2-nitro-1-amino-benzene-4-sulphonic acid *p*-cresyl ester is obtained from 2-nitro-1-chlorobenzene-4-sulphonic acid and *p*-cresol.

LATEST NOTIFICATIONS.

237,864. Washing-process for the production of a tricalcium saccharate of high purity. Steffen, jun., C. July 31, 1924.

237,872. Manufacture of condensation products of the anthraquinone series. Soc. of Chemical Industry in Basle. August 2, 1924.

237,922. Process for feeding internal-combustion engines with heavy petroleum oils, vegetable oils, paraffin oil, or other liquid hydrocarbons, and an internal-combustion engine for use in connection therewith. Makhonine, J. August 1, 1924.

Specifications Accepted with Date of Application

195,090. Distillation of mineral oils. Red River Refining Co., Inc. March 18, 1922.

211,882. Condensing apparatus especially adapted for refining oil. C. H. Leach. February 21, 1923.

214,221. Metallo-organic compounds, Process of making. Standard Development Co. April 13, 1923.

214,648. Electric furnaces for melting and treating ores and metals generally. T. Levoz. April 17, 1923.

214,999. Hydrocyanic acid from sulphocyanic acid or its compounds, Method for producing. J. A. DuBois. April 23, 1924.

215,754. Vertical retorts for distilling fuel. Koppers Coke Oven Co., Ltd. May 7, 1923.

217,566. Treating gases with granular adsorption agents for the purpose of separating or producing adsorbable materials from gas mixtures, Process of. Metallbank und Metallurgische Ges. June 13, 1923.

221,233. Aluminothermic processes of producing carbon-free metals and alloys of low silicon content, and the products obtained thereby. J. Debuigne. August 31, 1923.

221,487. Highly-active silica gels, Manufacture of. Farbenfabriken vorm. F. Bayer and Co. September 3, 1923.

221,514. Ammonium nitrate, Process of producing. Synthetic Ammonia and Nitrates, Ltd. September 6, 1923.

222,147. Nitrogen-hydrogen mixture for the synthetic production of ammonia, Method of producing. Synthetic Ammonia and Nitrates, Ltd. September 21, 1923.

226,224. Synthesis gases of synthetic ammonia plants, Art of treating—and apparatus therefor. Synthetic Ammonia and Nitrates, Ltd. December 13, 1923.

228,165. Barium chloride, Processes for the manufacture of—and the simultaneous production of alkali hydrosulphide. Verein für Chemische und Metallurgische Produktion. January 21, 1924.

234,072. Potassium and sodium hydroxides, Process for separating. Soc. of Chemical Industry in Basle. May 15, 1924.

237,302. Acetic anhydride and acetic acid, Manufacture of. British Celanese, Ltd., and W. Bader. January 24, 1924.

237,306. Ores or residues containing zinc, Treatment of. S. C. Smith and Chemical and Metallurgical Corporation, Ltd. January 29, 1924.

237,308. Treatment of lead chloride or basic chloride to convert it into other lead compounds, and application thereof to the winning of lead from ores, residues, and the like. S. C. Smith and Chemical and Metallurgical Corporation, Ltd. January 30, 1924.

237,330. Chlorine or other halogen gases, Means of detecting and giving visual indication of the presence of. H. Simon, Ltd., and H. J. Denham. April 22, 1924.

237,369. Solid combustibles, Process and apparatus for the internal distillation of. J. A. Lencauchez. May 5, 1924.

237,375. Dyestuffs, Manufacture of. O. Y. Imray. (*Soc. of Chemical Industry in Basle.*) May 8, 1924.

237,385. Indigoid dyestuffs, Manufacture of. O. Y. Imray. (*Soc. of Chemical Industry in Basle.*) May 19, 1924.

237,394. Catalysts for the synthesis of ammonia. Synthetic Ammonia and Nitrates, Ltd. (*E. Collett.*) May 29, 1924.

237,413. Iron compounds, Manufacture of suspensions of. Woodall-Duckham (1920), Ltd., E. W. Smith, and T. C. Finlayson. June 24, 1924.

237,415. Gases rich in ethylene, Process for obtaining. W. Carpmael. (*Chemische Fabriken vorm. Weiler Ter Meer.*) June 26, 1924.

237,457. Colour lakes, Manufacture of. British Dyestuffs Corporation, Ltd. J. Baddiley, R. S. Horsfall, A. Shepherdson and H. Jackson. September 23, 1924.

237,468. Recovering or separating caustic hydroxides from solutions containing them, Apparatus for—and for analogous purposes. J. Y. Johnson. (*Viscose Co.*) October 23, 1924.

237,528. Formamide, Manufacture and production of. J. Y. Johnson. (*Badische Anilin und Soda Fabrik.*) March 14, 1925.

Applications for Patents

Badische Anilin- and Soda-Fabrik and Johnson, J. Y. Preparation of artificial tanning-substances. 19,763. August 5.

Badische Anilin- and Soda-Fabrik and Johnson, J. Y. Preparations for developing baths for dyeing. 19,764. August 5.

Badische Anilin- and Soda-Fabrik. Dyeing process. 19,986. August 8. (Germany, October 30, 1924.)

Bonnard, A. H. Manufacture of vegetable carbon. 19,607. August 4.

Bonnard, L. H. Manufacture of vegetable carbon. 19,607. August 4.

British Dyestuffs Corporation, Ltd., and Saunders, K. H. Manufacture of amino triarylmethanes and dyestuffs therefrom. 19,625. August 4.

Cassella and Co., Ges., L., and Ransford, A. J. Manufacture of aromatic compounds and of dyestuffs therefrom. 19,938. August 7.

Ensoll, R. Recovery of hydrochloric acid from ferrous chloride solutions. 19,808. August 6.

Girouard, Sir E. P. C. Manufacture of cement, lime, &c. 19,866. August 7.

Harris, J. E. G., Scottish Dyes, Ltd., Thomas, J., and Wylam, B. Preparation of dyes, etc. 19,739. August 5.

Imray, O. Y. (Soc. of Chemical Industry in Basle). Manufacture of dyestuffs. 19,948. August 7.

Parkes, D. W., and Robinson, H. W. Removal of tar acids from ammonia liquor. 19,881. August 7.

Woven Wire Screens

IN order to ensure purity of the materials involved, it is essential that good quality wire cloth should be used for screening and filtering chemical products, and in their latest catalogue of their "Harco" woven wire, G. A. Harvey and Co. (London), Ltd., of Woolwich Road, S.E., describe the many applications of this material. A wire cloth of superfine brass, copper, or phosphor bronze is suitable for analytical purposes in the laboratory, such as the screen analysis of ore, cement, and chemicals, while woven wire filter cloth is made in meshes of various sizes for the filtration of liquids. The catalogue contains actual size photographs of the meshes supplied, which include rolled double crimped cloth for use as a backing or supporting cloth on rotary continuous filters. This is claimed to be especially applicable in drying processes, where it is necessary to keep the surface smooth and clean, and to offer as little friction as possible to the scrapers or shovels used in turning or moving the materials from the drying screens. The principle of double crimped wire cloth is that each strand is so woven that the wires in both warp and shoot are evenly corrugated, and this appears to eliminate the possibility of the wires shifting, while at the same time presenting a smooth surface.

United States' Dye Imports Increase

DURING the six months to June imports of coal tar dyes into the United States amounted to 2,503,151 pounds, valued at $2,320,844, compared with 1,215,059 pounds, valued at $1,243,884 in the corresponding period of 1924. The duty was reduced automatically in September last. Of these imports, 50 per cent. were taken from Germany and 32 per cent. from Switzerland.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, August 14, 1925.

THERE has been a slight broadening in the demand and a fair volume of business has been put through mainly for near delivery. There are, of course, a large number of mills, especially in the North, still closed for holidays, and until these reopen, business is bound to be restricted. Prices on the whole are steady, and it is noticed that continental manufacturers are more than ever indisposed to accept counter offers on their prices.

Export trade is still of small dimensions.

General Chemicals

ACETONE.—The position is unchanged with stocks still on the light side, and price firm at £76 per ton.

ACID ACETIC in steady demand. Price unchanged at £38 per ton for the 80% Technical with the usual £1 per ton extra for the Pure.

ACID CITRIC.—The demand has only been small with price unchanged at 1s. 5d. per lb., ex store.

ACID FORMIC continues in good request both for home and export. Price, ex wharf, main U.K. is unchanged at £48 to £49 per ton for 85% Technical.

ACID LACTIC.—A slightly better demand has been experienced, and for some export markets the demand is heavy. The price for 50% by weight material Technical is £43 to £44 per ton, ex wharf, main U.K.

ACID OXALIC.—Keen competition is in evidence for any large business passing and price keeps steady at 3¾d. per lb.

ACID TARTARIC.—Demand poor with price unchanged at 11½d.

ALUMINA SULPHATE.—No change is to be reported with price steady at £6 5s.

ARSENIC.—No improvement in demand can be reported and price has eased to £22 per ton.

BARIUM CHLORIDE.—In fair request for prompt delivery with price firm at £9 10s.

CREAM OF TARTAR.—A fair volume of business has been put through; price shows no change at £74 to £77.

EPSOM SALTS.—Price is slightly lower with an improving demand.

FORMALDEHYDE.—Price slightly firmer, although demand still leaves a lot to be desired. On offer at £40 to £41 per ton for spot delivery.

LEAD ACETATE.—Higher owing to advance in metal and stocks are light. Business has been put through at £45 10s. to £46 10s. for the White and Brown at £43 to £44.

LIME ACETATE.—Somewhat firmer at £16 per ton, with a steady demand.

METHYL ALCOHOL.—There is no change to report, price remaining steady at £48 to £50.

POTASSIUM CAUSTIC.—Price is slightly easier with only small demand.

POTASSIUM CHLORATE.—Slightly lower prices are offering for forward delivery, although spot stocks demand a premium.

POTASSIUM PERMANGANATE in fair request and unchanged in price at 7¾d. per lb.

POTASSIUM PRUSSIATE.—This is quite active with stocks on the light side and makers fairly well occupied. The price is firm at 7½d., and good business is being transacted both for spot and forward.

SODIUM ACETATE.—The price has eased to about £18 to £18 10s. There is slightly better demand.

SODIUM BICHROMATE.—No change in price is reported and there is a fair volume of business passing.

SODIUM HYPOSULPHITE.—The commercial quality slow of sale, but there is keen demand for the Photographic quality and good business is passing.

SODIUM PRUSSIATE.—A much firmer tendency is noticed in this product, which is quoted at 4¾d. to 4¾d. per lb. There is a large amount of inquiry in the market both for spot and forward.

SODA NITRITE.—Demand fairly satisfactory, price unchanged at £22 5s. to £23.

SODIUM SULPHIDE.—Unchanged in price with demand poor.

ZINC SULPHATE.—The market is firm at £13, with fair business being concluded.

Coal Tar Products

There is little change to report in the market for coal tar products.

90% BENZOL.—This product remains fairly steady at 1s. 9d. to 1s. 10d. per gallon on rails; for the near position, however, quantities are practically unobtainable.

PURE BENZOL.—1s. 11d. to 2s. per gallon on rails.

CREOSOTE OIL is firm at about 5¾d. per gallon on rails in the North and 7d. to 7¼d. per gallon on rails in the South.

CRESYLIC ACID.—This commodity is unchanged at 1s. 7d. to 1s. 8d. per gallon on rails for the Pale 97/99% quality, while the Dark 95/97% grade is quoted at 1s. 4d. per gallon.

SOLVENT NAPHTHA.—Firm at 1s. 4d. to 1s. 4½d. per gallon on rails.

HEAVY NAPHTHA.—This material is quoted at about 1s. 1d. per gallon on rails.

NAPHTHALENES are unchanged, the lower grades being worth from £3 to £3 15s. per ton, while the 74/76 quality is quoted at £5 to £5 10s. per ton, and the 76/78 quality at £5 15s. to £6 per ton.

PITCH.—There are no new features to report. The market is quiet, and prices seem to be more inclined to go down than to go up.

Latest Oil Prices

LONDON.—LINSEED OIL steady but quiet at 2s. 6d. decline. Spot, £43; August-December, £41 17s. 6d.; January-April, £41 10s. RAPE OIL quiet. Crude, crushed, £48 10s.; technical, refined, £51 10s. COTTON OIL firm. Refined common edible, £50; Egyptian, crude, £44 10s.; deodorised, £52. TURPENTINE steady. American, spot, 68s. 6d., paid, and sellers; September-December, 69s. 3d., sellers, and January-April, 71s. 3d., sellers, per cwt.

HULL.—LINSEED OIL.—Naked, spot, £42 5s.; August, £42; September-October, £41 15s. COTTON OIL.—Naked Bombay, crude, £41; Egyptian crude, £44; edible refined, £48; deodorised, £50; technical, £44 10s. PALM KERNEL OIL.—Crushed naked, 5½ per cent., £43 10s. GROUND-NUT OIL.—Crushed extracted, £48 10s.; deodorised, £52 10s. SOYA OIL.—Extracted and crushed, £42 15s.; deodorised, £45 5s. RAPE OIL.—Extracted, £47 15s. per ton net cash terms, ex mill.

Nitrogen Products Market

Export.—The British producers are still selling for prompt shipment on the basis of £11 10s. per ton, f.o.b. in single bags, but for forward shipment prices are in advance of these in accordance with position. The low summer prices have stimulated the demand in several countries, and there is every indication that the market will be firmer for the autumn months.

Home.—Home prices for delivery up to the end of November were announced in our last issue, and these will, of course, be adhered to under any circumstances. The home demand is quiet, as is normal for this period of the year. Home sales up to date are considerably in excess of those for the same period last year.

Nitrate of Soda.—The nitrate market is quiet. For prompt shipment, business has been done at about £11 5s., c.i.f. chief European ports. Closing quotations for spring delivery are £11 12s. to £12 4s. per ton according to the market. The statistical position of the nitrate producers is not as strong as at the same date last year.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

Acid Acetic, 40% Tech.—£20 per ton.
Acid Boric, Commercial.—Crystal, £40 per ton, Powder, £42 per ton.
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d., according to purity, strength and locality.
Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £10 10s. d/d; Contract, £9 10s. d/d. 4 ton lots.
Bisulphite of Lime.—£7 10s. per ton, packages extra, returnable.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chlorate (Solid).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.
Copper Sulphate.—£25 to £25 10s. per ton.
Methylated Spirit 64 O.P.—Industrial, 2s. 5d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
Nickel Sulphate.—£38 per ton d/d.
Nickel Ammonia Sulphate.—£38 per ton d/d.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5d. per lb.
Potassium Chlorate.—3¾d. per lb., ex wharf, London, in cwt. kegs.
Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. pd.
Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.
Soda Caustic, Solid.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength; 20s. less for contracts.
Soda Crystals.—£5 to £5 5s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£21 per ton.
Sodium Bicarbonate.—£10 10s. per ton, carr. paid.
Sodium Bichromate.—4d. per lb.
Sodium Bisulphite Powder 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.
Sodium Chlorate.—3d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Phosphate, £14 per ton, f.o.r. London, casks free.
Sodium Sulphate (Glauber Salts).—£3 12s. 6d. per ton.
Sodium Sulphide conc. solid. 60/65.—£13 5s. per ton d/d. Contract £13. Carr. pd.
Sodium Sulphide Crystals.—Spot, £8 12s. 6d. per ton d/d. Contract £8 10s. Carr. pd.
Sodium Sulphite, Pea Crystals.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—4⅝d. per lb. Slightly better demand. Crude 60's, 1s. 2d. to 1s. 3d. Little demand.
Acid Cresylic 97/99.—1s. 6d. to 1s. 9d. per gall. Pale, 95%, 1s. 5d. to 1s. 6d. per gall. Dark, 1s. 5d. per gall. Better demand.
Anthracene Paste 40%.—3d. per unit per cwt.—Nominal price. No business.
Anthracene Oil, Strained.—7½d. per gall. Unstrained, 7d. per gall. Nominal.
Benzol.—Crude 65's.—11d. to 1s. 3d. per gall., ex works in tank wagons. Standard Motor, 1s. 8d. to 1s. 10d. per gall., ex works in tank wagons. Pure, 1s. 9½d. to 2s. per gall., ex works in tank wagons.
Toluol.—90%, 1s. 8½d. to 1s. 9d. per gall. More inquiry. Pure, 1s. 9½d. to 2s. per gall.
Xylol Commercial.—1s. 9½d. to 2s. 3d. per gall. Pure, 3s. 3d. per gall.
Creosote.—Cresylic, 20/24%, 8½d. per gall. Standard specification, middle oil, heavy, 6d. to 6¾d. per gall. Strong demand for near delivery.
Naphtha.—Solvent 90/160, 1s. 5d. to 1s. 9d. per gall. Demand good. Solvent 90/190, 1s. to 1s. 4d. per gall. Fair demand.
Naphthalene Crude.—Drained Creosote Salts, £3 to £5 per ton. Market quiet. Whizzed or hot pressed. No demand.
Naphthalene.—Crystals and Flaked, £10 to £13 per ton, according to districts. Very quiet.
Pitch.—Medium soft, 40s. to 42s. 6d. per ton, according to district. Little inquiry.
Pyridine.—90/160, 19s. 6d. to 20s. per gall. Heavy, 11s. 6d. to 12s. per gall. Fair business.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.
Acid Anthranilic 7s. per lb. 100%.
Acid Benzoic 1s. 9d. per lb.
Acid H.—3s. 6d. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 2d. per lb. 100% basis d/d.
Acid Neville and Winther.—4s. 10d. per lb. 100% basis d/d.
Acid Sulphanilic.—9d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—10d. per lb. d/d.
Aniline Oil.—7d. per lb. naked at works.
Aniline Salts.—7d. per lb. naked at works.
Antimony Pentachloride.—1s. per lb. d/d.
Benzidine Base.—3s. 6d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 1d. per lb.
p-Chlorphenol.—4s. 3d. per lb. d/d.
p-Chloraniline.—3s. per lb. 100% basis.
o-Cresol 29/31° C.—3d. per lb. Demand quiet.
m-Cresol 98/100%.—2s. 1d. per lb. Demand moderate.
p-Cresol 32/34° C.—2s. 1d. per lb. Demand moderate.
Dichloraniline.—2s. 3d. per lb.
Dichloraniline S. Acid.—2s. 3d. per lb. 100% basis.
Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable.
Dimethylaniline.—2s. 1d. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzene.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. per lb. naked at works.
Diphenylaniline.—2s. 10d. per lb. d/d.
G. Salt.—2s. 2d. per lb. 100% basis d/d.
a-Naphthol.—1s. 10d. per lb. d/d.
B-Naphthol.—1s. per lb. d/d.
a-Naphthylamine.—1s. 3d. per lb. d/d.
B-Naphthylamine.—3s. 9d. per lb. d/d.
m-Nitraniline.—3s. 9d. per lb. d/d.
p-Nitraniline.—1s. 11d. per lb. d/d.
Nitrobenzene.—5d. to 5½d. per lb. naked at works.
o-Nitrochlorbenzol.—2s. 3d. per lb. 100% basis d/d.
Nitronapthalene.—10d. per lb. d/d.
p-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.
p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
m-Phenylene Diamine.—4s. per lb. d/d.
p-Phenylene Diamine.—9s. 9d. per lb. 100% basis d/d.
R. Salt.—2s. 4d. per lb. 100% basis d/d.
Sodium Naphthionate.—2s. 2d. per lb. 100% basis d/d.
o-Toluidine.—10d. per lb.
p-Toluidine.—2s. 3d. per lb. naked at works.
m-Toluylene Diamine.—4s. per lb. d/d.

Wood Distillation Products

Acetate of Lime.—Brown £9 10s. to £10. Quiet market. Grey £15 per ton. Liquor, 9d. per gall. 32° Tw.
Acetone.—£73 per ton.
Charcoal.—£7 5s. to £8 10s. per ton, according to grade and locality.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
Wood Creosote.—2s. 9d. per gall. Unrefined.
Wood Naphtha, Miscible.—4s. 3d. per gall.
60% O.P. Solvent, 4s. 6d. per gall. 40% O.P.
Wood Tar.—£4 per ton.
Brown Sugar of Lead.—£43 per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 7½d. to 1s. 5d. per lb., according to quality. Crimson, 1s. 5d. to 1s. 7½d. per lb., according to quality.
Arsenic Sulphide, Yellow.—2s. per lb.
Barytes.—£3 10s. to £6 15s. per ton, according to quality.
Cadmium Sulphide.—4s. 4d. per lb.
Carbon Bisulphide.—£25 to £28 per ton, according to quantity.
Carbon Black.—5½d. per lb., ex wharf.
Carbon Tetrachloride.—£55 to £60 per ton, according to quantity, drums extra.
Chromium Oxide, Green.—1s. 3d. per lb.
Diphenylguanidine, 4s. to 4s. 3d. per lb.
Indiarubber Substitutes, White and Dark.—5½d. to 6½d. per lb.
Lamp Black.—£43 per ton, barrels free.
Lead Hyposulphite.—9d. per lb.
Lithopone, 30%.—£22 10s. per ton.
Mineral Rubber "Rubpron."—£13 12s. 6d. per ton f.o.r. London.
Sulphur.—£9 to £11 per ton, according to quality.

Sulphur Chloride.—4d. per lb., carboys extra.
Sulphur Precip. B.P.—£50 to £55 per ton.
Thiocarbamide.—2s. 6d. to 2s. 9d. per lb.
Thiocarbanilide.—2s. 1d. to 2s. 3d. per lb.
Vermilion, Pale or Deep.—5s. per lb.
Zinc Sulphide.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

Acid, Acetic 80% B.P.—£39 per ton ex wharf London in glass containers.
Acid, Acetyl Salicylic.—2s. 7d. to 2s. 9d. per lb. British makers meeting foreign competition in quality and price.
Acid, Benzoic B.P.—2s. to 2s. 3d. per lb., according to quantity.
Acid, Boric B.P.—Crystal £46 per ton, Powder £50 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 4d. to 1s. 4½d. per lb., less 2½%.
Acid, Gallic.—2s. 9d. per lb. for pure crystal, in cwt. lots.
Acid, Pyrogallic, Crystals.—5s. 4d. to 5s. 6d. per lb.
Acid, Salicylic.—1s. 4d. to 1s. 5d. per lb. Good demand. Technical.—10½d. to 11d. per lb.
Acid, Tannic B.P.—2s. 8d. per lb.
Acid, Tartaric.—11½d. per lb., less 5%.
Amidol.—9s. per lb., d/d.
Acetanilide.—1s. 5d. per lb. for quantities.
Amidopyrin.—13s. 3d. per lb.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb., according to quantity.
Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
Atropine Sulphate.—11s. 6d. per oz. for English make.
Barbitone.—11s. per lb.
Benzonaphthol.—3s. 6d. per lb. spot.
Bismuth Carbonate.—12s. 9d. to 14s. 9d. per lb.
Bismuth Citrate.—11s. 4d. to 13s. 4d. per lb.
Bismuth Salicylate.—10s. 2d. to 12s. 2d. per lb.
Bismuth Subnitrate.—10s. 9d. to 12s. 9d. per lb.
} Prices advanced. Supplies of the metal somewhat easier.
according to quantity.
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 2s. 1d. to 2s. 3d. per lb.; sodium, 2s. 2d. to 2s. 4d. per lb.; ammonium, 2s. 6d. to 2s. 8d. per lb., all spot. British or Imported. Prices unchanged. Firm.
Calcium Lactate.—1s. 6½d. to 1s. 8d., according to quantity.
Chloral Hydrate.—3s. 5d. to 3s. 6d. per lb., duty paid.
Chloroform.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
Creosote Carbonate.—6s. 9d. per lb.
Formaldehyde.—£38 per ton, in barrels ex wharf.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 60%, 2s. 6d. per lb.
Guaiacol Carbonate.—6s. 3d. to 6s. 6d. per lb.
Hexamine.—2s. 4d. powder crystal, 2s. 6d. free running crystal, per lb.
Homatropine Hydrobromide.—30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydrogen Peroxide (12 vols.).—1s. 8d. per gallon f.o.r. makers' works, naked.
Hydroquinone.—4s. 1½d. per lb.
Hypophosphites.—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—1s. 8d. to 1s. 11d. per lb. Green, 2s. 2d. to 2s. 7d. per lb. U.S.P., 1s. 7d. to 1s. 10d. per lb.
Magnesium Carbonate.—Light Commercial, £34 per ton net. Light pure, £46 per ton.
Magnesium Oxide.—Light Commercial, £65 per ton, less 2½%, price reduced; Heavy Commercial, reduced to £24 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
Menthol.—A.B.R. recrystallised B.P., 46s. 6d. per lb., less 2½%; prompt delivery. Synthetic, 22s. 6d. to 27s. 6d. per lb., according to quality. English make.
Mercurials.—Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 7d. to 3s. 9d. per lb.; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 3s. 10d. to 4s. per lb. Still quiet.
Methyl Salicylate.—1s. 8d. per lb.
Methyl Sulphonal.—17s. 9d. per lb.
Metol.—11s. per lb. British make.
Paraformaldehyde.—2s. for B.P. quality.
Paraldehyde.—1s. 4d. per lb., in free bottles and cases.
Phenacetin.—4s. 2d. to 4s. 3d. per lb. in cwt. lots.
Phenazone.—6s. 2d. per lb.
Phenolphthalein.—4s. 2d. per lb.
Potassium Bitartrate 99/100% (Cream of Tartar).—72s. per cwt., less 2½% for ton lots.
Potassium Citrate.—1s. 7d. to 1s. 10d. per lb.
Potassium Ferricyanide.—1s. 9d. per lb. Quiet.
Potassium Iodide.—16s. 8d. to 17s. 2d. per lb., according to quantity. Steady market.
Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included, f.o.r. London.
Potassium Permanganate.—B.P. crystals, 7½d. per lb., spot.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—3s. 10½d. per lb. In fair quantities.
Saccharin.—63s. per lb. in 50 lb. lots.
Salol.—3s. 3d. to 3s. 6d. per lb.
Silver Proteinate.—12s. per lb. for satisfactory product light in colour.
Sodium Benzoate, B.P.—1s. 10d. to 2s. 2d. per lb.
Sodium Citrate, B.P.C., 1911.—1s. 4d. to 1s. 7d. per lb., B.P.C., 1923, 1s. 7d. to 1s. 8d. per lb., according to quantity. U.S.P., 1s. 7d. to 1s. 10d. per lb.
Sodium Hyposulphite, Photographic.—£14 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—75s. per cwt., for ton lots and upwards.
Sodium Salicylate.—Powder, 1s. 11d. to 2s. 2d. per lb. Crystal, 2s. to 2s. 2d. per lb. Flake, 2s. 3d. per lb.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb.
Sodium Sulphite, anhydrous, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.
Sulphonal.—12s. 8d. per lb.
Thymol.—12s. to 15s. per lb.

Perfumery Chemicals

Acetophenone.—9s. per lb.
Aubepine (ex Anethol).—10s. per lb.
Amyl Acetate.—3s. per lb.
Amyl Butyrate.—6s. 6d. per lb.
Amyl Salicylate.—3s. 1½d. per lb.
Anethol (M.P. 21/22° C.).—5s. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 6d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 6d. per lb.
Benzaldehyde free from Chlorine.—3s. per lb.
Benzyl Benzoate.—2s. 9d. per lb.
Cinnamic Aldehyde Natural.—15s. 6d. per lb.
Coumarin.—13s. 9d. per lb.
Citronellol.—19s. per lb.
Citral.—8s. 6d. per lb.
Ethyl Cinnamate.—9s. per lb.
Ethyl Phthalate.—3s. per lb.
Eugenol.—9s. 6d. per lb.
Geraniol (Palmarosa).—27s. per lb.
Geraniol.—8s. to 16s. per lb.
Heliotropine.—6s. 3d. per lb.
Iso Eugenol.—14s. 6d. per lb.
Linalol ex Bois de Rose.—19s. 6d. per lb.
Linalyl Acetate.—18s. 6d. per lb.
Methyl Anthranilate.—9s. 3d. per lb.
Methyl Benzoate.—5s. per lb.
Musk Ambrette.—50s. per lb.
Musk Ketone.—37s. 6d. per lb.
Musk Xylol.—9s. per lb.
Nerolin.—4s. per lb.
Phenyl Ethyl Acetate.—15s. per lb.
Phenyl Ethyl Alcohol.—13s. per lb.
Rhodinol.—36s. 6d. per lb.
Safrol.—1s. 8d. per lb.
Terpineol.—1s. 9½d. per lb.
Vanillin.—22s. 9d. per lb.

Essential Oils

Almond Oil, Foreign S.P.A.—13s. 3d. per lb.
Anise Oil.—3s. 6d. per lb.
Bergamot Oil.—20s. per lb.
Bourbon Geranium Oil.—17s. 6d. per lb.
Camphor Oil.—60s. per cwt.
Cananga Oil, Java.—11s. 3d. per lb.
Cinnamon Oil, Leaf.—5d. per oz.
Cassia Oil, 80/85%.—9s. per lb.
Citronella Oil.—Java, 85/90%, 4s. 3d. per lb. Ceylon, 2s. 6d. to 2s. 9d. per lb., according to quality.
Clove Oil.—6s. 9d. per lb.
Eucalyptus Oil, 70/75%.—1s. 9½d. per lb.
Lavender Oil.—French 38/40% Esters, 27s. 6d. per lb.
Lemon Oil.—5s. 3d. per lb.
Lemongrass Oil.—4s. 6d. per lb.
Orange Oil, Sweet.—10s. 9d. per lb.
Otto of Rose Oil.—Bulgarian, 60s. per oz. Anatolian, 35s. per oz.
Palma Rosa Oil.—13s. 9d. per lb.
Palma Rose Oil.—15s. 3d. per lb.
Peppermint Oil.—Wayne County. No good quality material available. Japanese, 17s. 3d. per lb.
Petitgrain Oil.—9s. per lb.
Sandal Wood Oil.—Mysore, 26s. per lb. Australian, 18s. 6d. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, August 12, 1925.

DURING the past week business in the heavy chemical market has been fairly satisfactory, good inquiry being received both for home and export. There are no changes of importance to note with the exception of Red Lead and White Lead, which are both higher.

Industrial Chemicals

ACID ACETIC.—In moderate request and price unchanged. 98/100% glacial, £56 to £67 per ton according to quality and packing, c.i.f. U.K. ports; 80% pure, £40 to £42 per ton; 80% technical, £39 to £41 per ton, packed in casks, c.i.f. U.K. ports.

ACID BORIC.—Crystal, granulated or small flaked, £40 per ton; powdered, £42 per ton, packed in bags carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—In little demand. Nominally 4d. per lb. delivered, but could probably be obtained for less.

ACID CITRIC, B.P. CRYSTALS.—Offered for forward delivery at 1s. 4¼d. per lb., less 5%, c.i.f. U.K. ports. Spot material about 1s. 4½d. per lb., less 5%, ex store.

ACID FORMIC, 85%.—Offered for prompt shipment from the continent at about £47 per ton, c.i.f. U.K. ports. Spot material quoted £49 per ton, ex store.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC 80°.—Usual steady demand quoted £23 15s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Still in poor demand. Quoted 3½d. per lb., ex wharf.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Spot material quoted 1s. per lb., less 5%, ex store. Offered for early delivery at 11¼d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Spot lots quoted £6 10s. per ton, ex store. Offered for prompt shipment from the continent at about £6 5s. per ton, c.i.f. U.K. ports.

ALUM, LUMP POTASH.—Spot material unchanged at £9 7s. 6d. per ton, ex store. Offered for prompt shipment at about £8 per ton, c.i.f. U.K. ports.

AMMONIA ANHYDROUS.—Moderate demand and price unchanged at 1s. 4½d. per lb., less 5%, ex station. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton. Packed in 5 cwt. casks delivered U.K. ports.

AMMONIA LIQUID, 880°.—In steady demand. Unchanged at 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals quoted £28 per ton, ex station. Offered from the continent at about £24 per ton, c.i.f. U.K. ports. Fine white crystals quoted £19 10s. per ton, c.i.f. U.K. ports.

ARSENIC.—Refined white Cornish arsenic at £24 10s. per ton, ex wharf, early delivery. Spot lots quoted £25 10s. per ton, ex store. Foreign arsenic on offer at £22 10s. per ton, c.i.f. U.K. ports.

BARIUM CARBONATE, 98/100%.—Offered from the continent at £7 15s. per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE.—Spot material now offered at about £9 15s. per ton, ex store. Quoted £8 5s. per ton, c.i.f. U.K. ports, prompt shipment from the continent.

BLEACHING POWDER.—Spot lots English material, £10 10s. per ton, ex station. Contracts 20s. per ton less. On offer from the continent at about £8 7s. 6d. per ton, c.i.f. U.K. ports.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BORAX.—Granulated, £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton. Carriage paid U.K. stations; minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, carriage paid U.K. stations. Continental on offer at about £3 17s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Now quoted £3 10s. per ton, ex wharf, packed in casks.

COPPER SULPHATE.—Offered from the continent at about £21 15s. per ton, c.i.f. U.K. ports. English material for export unchanged at about £24 10s. per ton, f.o.b.

FORMALDEHYDE, 40%.—Offered for prompt shipment from the continent at £38 10s. per ton, c.i.f. U.K. ports. Spot material available at about £39 10s. per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £2 17s. 6d. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material now quoted £41 15s. per ton, c.i.f. U.K. ports. Spot material available at £43 10s. per ton, ex store.

LEAD, WHITE.—Quoted £43 per ton, ex store, spot delivery.

LEAD, ACETATE.—White crystals quoted £44 10s. per ton, spot delivery; Brown, £43 per ton, ex store; White crystals on offer from the continent at £43 15s. per ton, c.i.f. U.K. ports. Brown about £38 per ton, c.i.f. U.K. ports.

LEAD, NITRATE.—In moderate demand. Quoted £42 per ton, ex station or f.o.b.

MAGNESITE, GROUND CALCINED.—Usual steady demand, and price unchanged at about £8 per ton, ex station.

MAGNESIUM CHLORIDE.—Spot material now quoted £6 per ton, ex store. Only a limited quantity available.

POTASH CAUSTIC, 88/92%.—Offered for prompt shipment at about £28 5s. per ton, ex wharf. Spot material quoted at about £30 per ton, ex store.

POTASSIUM BICHROMATE.—Price for home consumption, 5d. per lb. delivered.

POTASSIUM CARBONATE, 96/98%.—Quoted £25 5s. per ton, c.i.f. U.K. ports. Spot material available at about £26 5s. per ton, ex store.

POTASSIUM CHLORATE.—Still scarce for early delivery. Some available at about 3¾d. per lb., c.i.f. U.K. ports. Spot material quoted 4d. per lb., ex store.

POTASSIUM NITRATE (SALTPETRE), 99%.—Refined granulated quoted at about £24 10s. per ton, c.i.f. U.K. ports. Spot material quoted £27 per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—On offer at 7½d. per lb., ex store. Offered for prompt shipment from the continent at about 7¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE, YELLOW.—Nominally 7½d. per lb., ex store, but this price could be shaded for fairly large quantities.

SODA CAUSTIC.—76/77%, £18 per ton; 70/72%, £16 12s. 6d. per ton; broken, 60%, £17 2s. 6d. per ton; powdered, 98/99%, £21 7s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Offered from the continent at about £17 10s. per ton, c.i.f. U.K. ports. Spot material quoted £19 10s. per ton, ex store.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM CARBONATE.—(Soda Crystals), £5 to £5 5s. per ton, ex quay or station; powdered or pea quality, £1 7s. 6d. per ton more; (alkali, 58%), £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material quoted £9 10s. per ton, ex station. Pea crystals, £14 per ton, ex station. Continental on offer at about £9 5s. per ton, ex store.

SODIUM NITRATE.—Quoted £13 per ton, ex store; 96/98%, refined quality, 7s. 6d. per ton extra.

SODIUM NITRITE, 100%.—Quoted £24 per ton, ex store. Offered from the continent at about £22 5s. per ton, c.i.f. U.K. ports.

SODIUM PRUSSIATE, YELLOW.—Now quoted 4d. per lb., ex store, in very moderate demand.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption, £3 10s. per ton, f.o.r. works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—English material. Solid, 60/62% now £13 per ton. Broken, £14 per ton. Flake, £15 per ton. Crystal, £8 10s. per ton. Carriage paid U.K. stations. Minimum, 4-ton lots, with slight reductions for contracts to the end of the year; 60/62% solid, offered from the continent at £10 15s. per ton, c.i.f. U.K. ports. Broken, £1 per ton more; 30/32% crystals, £7 15s. per ton, c.i.f. U.K. ports.

SULPHUR.—Flowers, £10 10s.; roll, £9 10s.; rock, £9 7s. 6d.; ground, £9 10s. per ton, ex store. Spot delivery, nominal.

ZINC CHLORIDE.—100% quoted from the continent at £24 5s. per ton, c.i.f. U.K. ports; 97/98%, of English manufacture, on offer at £25 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Commercial crystals on offer from the continent at about £12 per ton, c.i.f. U.K. ports.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

TOLUIDINE.—Some home inquiries. 5s. 9d. per 100 per cent.

BENZOIC ACID.—Fair home inquiries. 1s. 9d. per lb.

DIMETHYLANILINE.—Fair home inquiries. 2s. 1d. per lb.

NAPHTHIONATE OF SODA.—Some home inquiries. 1s. 9d. per lb.

BETA NAPHTHYLAMINE.—Some home inquiries. 3s. 10d. per lb.

British Sugar Beet Industry

A WHITE PAPER just issued under the British Sugar (Subsidy) Act, 1925, contains statements in the form of balance sheets, transmitted to the Minister of Agriculture and Fisheries by companies manufacturing sugar or molasses from home-grown beet. The balance sheet, as at March 31 last, of Home Grown Sugar, Ltd. (Kelham factory), showed total liabilities of £493,696, the balance on revenue account for the year being £3,125. On the assets side, the factory, buildings, plant and machinery figure at £289,683, and the cash at bank and in hand amounted to £7,369.

The English Beet Sugar Corporation, Ltd. (Cautley factory), in their balance sheet show total liabilities of £673,281, including a general reserve of £50,000, and balance on profit and loss account of £67,568. The assets comprise £376,316 for land, buildings, plant and machinery, with cash at bankers and in hand amounting to £216,047. There is a balance of subsidy outstanding of £8,736. The balance sheet for the year ended February 28 last of the Anglo-Scottish Beet Sugar Corporation, Ltd. (Colwick factory), shows total liabilities of £368,867, including a loan of £90,000 guaranteed by the Treasury, and secured over the assets of the Corporation. The assets comprise £285,681 expenditure to date on factories at Nottingham and Spalding, which, less £4,000 depreciation for period to date, leaves £281,681; while sundry debtors, including Government subsidy, figure for an amount of £48,559, the cash balance remaining at £247.

New Factories

The beet sugar industry will be further developed by the completion of a large factory at Wissington, near Ely, in which employment for at least 450 people will be found in the next few weeks. The factory occupies 40 acres of land, includes 13 miles of private railway line and taps 5,000 acres of land. Mr. W. A. Towler, a large landowner in the Fens, is primarily responsible for the enterprise, which this year will handle 600 tons of beet a day, and next year it is hoped that the figure will be increased to 5,000.

It is also understood that negotiations are nearing completion for the erection of a factory for making sugar beet at Cross Farm, Frimley Green. A considerable amount of land, extending over two miles in length from Frimley Green to Frimley Station, has been purchased. New sidings are to be made and housing accommodation is to be provided for a staff of about 500. The work is to begin almost at once as the vendors of the land state that they give up possession in September. It is stated the factory will be owned by a British firm, but at the outset the manager and his principal assistants are to be French. A considerable quantity of the beet will be grown in the neighbourhood.

Beet Sugar Machinery

An interesting development has recently taken place under which Sir W. G. Armstrong, Whitworth and Co., Ltd., have entered into a close working agreement with Breitfeld Danek, Ltd., of Prague, Czechoslovakia, for their technical co-operation in the erection and installation of beet sugar factories in this country and throughout the British Empire. Sir W. G. Armstrong, Whitworth and Co., Ltd., will be the prime contractors for the erection and installation, Breitfeld Danek acting as consulting engineers and technical advisers. In accordance with the terms of the Beet Sugar Subsidy Act, Sir W. G. Armstrong, Whitworth and Co., Ltd., will manufacture at least 75 per cent. of the machinery in Great Britain, the remainder, consisting of highly specialised parts, being produced by Breitfeld Danek in their own works. Breitfeld Danek are an old-established beet sugar machinery manufacturing firm in Czechoslovakia, who have erected and installed sugar factories for many years all over Europe and elsewhere.

Hydrogenation Plants Wanted Abroad

A LONDON firm writes: "We have been asked by friends abroad to send them catalogues and prices of hydrogenation plants and plants for the production of electrolytic hydrogen. We should esteem it a favour if you could give us the names of firms who deal in such plants." We shall be glad to forward to the inquirer any catalogues or other particulars addressed to THE CHEMICAL AGE, 8, Bouverie Street, E.C.4.

Liquidation of the Stinnes Concern

UNLESS the banks which undertook to support the liquidation of the Stinnes concern in Germany, estimated only recently to be worth a milliard gold marks, completely alter their methods the concern will declare its bankruptcy, or ask for the supervision of the liquidation by the Court, according to the *Rheinisch-Westfaelishe Zeitung*. This journal, which is generally regarded as being the mouthpiece of the Stinnes family, says that the banks in question are unwilling to assume additional obligations on the alleged ground that fresh liabilities of the concern are continually being discovered. The attitude of the banks obviously induced Herr Stinnes, jun., to see the president of the Reichsbank, Dr. Schacht, who, however, was unable to give him any assurance. This, in the opinion of the Stinnes family, means that "Schacht approves of the new course of the banks, thus surrendering German economic life generally to ruin." It is stated that besides the customary interest charged, the banks also demanded from the Stinnes concern a 4 per cent. commission on the capital they are keeping in readiness for the requirements of the liquidation. The banking group conducting the Stinnes liquidation, however, denies that there are any differences between themselves and the Stinnes family.

Cellulose Holdings and Investment

AT the annual meeting held in London on August 8 the chairman, Mr. A. W. Tait, reported an increased net profit of £35,133 for the year, as compared with £14,829 in the previous year. The shares which the company held in the Midland Counties Electric Supply Co., Ltd., had been sold, he stated, and practically the whole of the proceeds had been applied in the redemption of debenture stock of the company. He emphasised the improved position and progress of British Celanese, Ltd., in which the company is so largely interested, and referred the shareholders to the encouraging remarks made by the chairman of that company, Major-General Dawnay, at the annual meeting. (THE CHEMICAL AGE, Vol. XIII, p. 123.)

The report and accounts for the year were adopted, and the election of Mr. Gustave Popelier as a director was confirmed.

The Price of House Coal

IN a leaflet issued by the Coal Distributors' Information Department, reference is made to the statement that coal which costs from 16s. to 18s. per ton at the pithead is being sold in London at about 50s. a ton. This mis-statement, it says, has been frequently exposed, but is constantly repeated. The figure of 16s. to 18s. at the pithead includes all coal, whether slack or best house, and whether sold for export, for industrial, or for domestic purposes. It is an average figure for the whole industry. The figure of 50s. a ton is the retail price of high quality house coal. It is *not* an average figure, *but the price* of a particular grade of high quality. In the figure of 16s. to 18s. would be included slack at 5s. to 7s., and house coal at 25s. to 30s.

A National Dye Industry Suggested

THE Committee on Industry and Trade heard evidence on behalf of the Piece Dyers' Association. It was submitted that, owing to the absence of a free market in dyestuffs, prices both of British and foreign wares were maintained at an artificially high level, thus involving the colour-using industries in an increased cost in their raw materials to the extent of many hundreds of thousands of pounds sterling annually over and above the normal commodity price increase. Also, that the cost of establishing the dye-making industry of this country, necessary for both industrial and national security, was being borne entirely by the colour-using industries, whereas it should be a national charge.

Sulphide of Zinc Required

A CONTINENTAL firm are inquiring for prices and samples of sulphide of zinc of the finest quality obtainable. Manufacturers interested are invited to communicate with THE CHEMICAL AGE, 8, Bouverie Street, London, E.C.4.

Company News

KEELEY SILVER MINES.—The directors have declared an 8 per cent. dividend with a bonus of 4 per cent., payable on September 15.

BROKEN HILL PROPRIETARY CO.—The net profit for the year ended May 31, 1925, amounts to £372,307, after providing £213,518 for ordinary depreciation and £75,000 special depreciation.

BRADFORD DYERS' ASSOCIATION, LTD.—The board has declared an interim dividend for the year to December 31, 1925, on the ordinary shares at the rate of 1s. per share, subject to income tax. The dividend warrants will be posted on September 1.

ENGLISH OILFIELDS, LTD.—The directors' report to December 31 last states that a portion of the company's plant has been adapted for use in connection with products which are now being made, and it is anticipated that further portions will be used for processes under investigation. A small portion of surplus plant has been realised, and negotiations are in progress in several directions for utilisation or disposal of remainder. It is expected that arrangements will soon be completed whereby major portion of plant will be used or disposed of on favourable terms. Negotiations have also been opened for use of the company's railway and the portion of its property which is not at present in use. Shortly before the close of last financial year the company succeeded in getting on the market some additional products, turnover in which is gradually increasing, and which will, when developed, ensure profitable employment of a portion of the property. The report adds that, as mentioned at the last general meeting, the directors contemplate reducing the capital by writing down the assets to their actual value, a scheme for which will be put forward at the earliest possible moment.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CHEMICALS, DRY COLOURS, ETC.—A newly established firm in Bombay wishes to represent British firms interested in chemicals, dry colours, paints, etc. (Reference No. 184).

CHEMICAL AND METALLURGICAL PRODUCTS.—A commercial organisation in Jassey, Roumania, desires to secure the representation of British manufacturers and exporters of chemical and metallurgical products. (Reference No. 195.)

OXIDE OF IRON.—The Gas Committee, Stoke-on-Trent, invites tenders for 350 tons of oxide of iron. Tenders, endorsed "Tenders for Oxide of Iron," to be delivered to Mr. E. B. Sharpley, town clerk, Town Hall, Stoke-on-Trent, by September 1.

Tariff Changes

UNION OF SOUTH AFRICA.—Extensive alterations in the South African tariffs are printed in the *Board of Trade Journal* for August 6, 1925.

FRANCE.—Recent decisions as to classification of certain articles include the following: Synthetic acetic acid, as Acetic acid, according to kind (No. 0203); amidoazotoluol, hydrochlorate of amidoazotoluol, orthoamidoazotoluol and hydrochlorate of orthoamidoazotoluol, as coal tar dyestuffs—azoic colouring materials, according to kind (No. 294); dyestuffs with a base of several coal tar derivatives, as the most highly taxed coal tar dyestuff in the mixture; Anti-acid compositions formed by a mixture of mineral pitch and carbonate of lime, as unspecified chemical products (No. 0381); ferro-cobalt (revised classification), same duties as ferro-nickel or nickel steel (No. 207 quat.); crude methyl alcohol mixed with acetone in the proportion of 20 per cent. or less, as crude methyl alcohol (No. 0194), more than 20 per cent., as acetone (No. 0200); rectified methylic alcohol mixed with acetone in any proportion, as rectified methyl alcohol (No. 0195).

ROUMANIA.—Export duties are now fixed for petroleum residues, 1,000 lei per 10 metric tons, and petrol (motor spirit), 2,000 lei per 10 metric tons. These products may only be exported when home demands have been met.

SWEDEN.—The excise duty on sugar manufactured or imported has been reduced from 16 to 14 öre per kilogramme.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to September 5, 1925:

"EFICO."

455,352. For composition for the prevention and removal of incrustation in steam boilers. Hamilton, McAndrew, trading as McAndrew, Wormald and Co., 43, Queen Street, Govan, Glasgow; boiler scale removing composition manufacturer. January 15, 1925.

"SAND-BANUM."

457,207. For boiler compounds for removing or preventing incrustation. Josef Herok, trading as Unternehmung fur Industrie-Grundungen Ing. J. Herok, Wiesingerstrasse 8, Vienna 1, Austria; engineer and merchant. March 16, 1925. (Date claimed under International Convention, February 11, 1925.)

"SYNTHOX."

459,201. For a chemical substance to be used in the purification of gas. Alan Johnston and Partner, Abbey House, 10, Victoria Street, Westminster, London, S.W.1; coke and by-product factors. May 23, 1925.

"TARMINE."

459,202. For enamels and paints. Class 1. Alan Johnston and Partner, Abbey House, 10, Victoria Street, Westminster, London, S.W.1; coke and by-product factors. May 23, 1925.

"PURILLO."

459,883. For bituminous and other paints. Montgomerie, Stobo and Co., Ltd., Victory Works, George Street, Bridgeton, Glasgow; manufacturers. June 19, 1925.

"BITUMITE."

460,159. For chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. George M. Callender and Co., Ltd., 25, Victoria Street, London, S.W.1; bitumen manufacturers. June 30, 1925.

"METARSENOBILLON."

459,333. For chemical substances prepared for use in medicine and pharmacy. May and Baker, Ltd., Garden Wharf, Church Road, Battersea, London, S.W.1; manufacturing chemists. May 29, 1925. (To be Associated. Sect. 24.)

Opposition to the Registration of the following Trade Marks can be lodged up to September 12, 1925.

"FERTILITE."

B455,133. For a fertiliser. The Worcestershire Fertiliser Co., Ltd., Canal Works, Hanbury Road, Stoke Prior, near Bromsgrove, Worcestershire; manufacturers. January 8, 1925. User claimed from June 1st, 1920.

"DEPHENDOL."

460,128. For chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. Class 1. Brown and Forth, Ltd., 21, Farringdon Street, London, E.C.4; chemical manufacturers and merchants. June 29, 1925.

New British Chemicals for America

A PHILADELPHIA (U.S.A.) chemical house sends an inquiry for any new chemicals or compounds which may have been produced in this country during and since the war and which are still unknown on the American chemical market. Further information may be obtained on application to THE CHEMICAL AGE, 8, Bouverie Street, London, E.C.4.

Chemical Industries of St. Helens

An Interesting History

THE chemical industries of St. Helens are dealt with in an industrial survey of the town and district in the current number of the *Manchester Guardian Commercial*. St. Helens, the writer states, was formerly one of the most important towns connected with the heavy chemical industry, but, for one reason and another, this importance is now declining. At one time there were about 15 or 20 chemical works in the immediate neighbourhood, but now only the Hardshaw Brook Works and the Baxter Works are active. Some have already been dismantled, while others are now going through the process, part of the plant being taken to Widnes, where the United Alkali Co. seems to be concentrating its operations. The change is partly accounted for by the fact that there are large supplies of brine at Penketh, near Widnes. At St. Helens, however, it is necessary to transport rock-salt from Preesall, near Fleetwood, and then dissolve it in water at the works.

Great Achievements

The history of the chemical industry in this district is a long one, stretching back to 1823, and it contains many pages of romantic struggles, of inventions and changes, and of great achievements. The United Alkali Co. was founded in 1890 by the amalgamation of a large number of concerns engaged in alkali manufacture in different parts of the country. The most prominent figure in the early days was James Muspratt, who first introduced the Le Blanc process of manufacture, and the present vast organisation has grown up on the nucleus of this pioneer firm. Gradually the Le Blanc process fell into disuse, and the ammonia-soda process is now employed exclusively. Thus it is that at the Hardshaw Brook Works the old and the new plant can be seen side by side. There is the elaborate and extensive apparatus required for the Le Blanc process, which obviously must have required a very large staff of labour to operate it, while at the other side of the works, in cell-rooms, is the entire plant of the electrolytic apparatus, each room containing perhaps a hundred cells, overlooked by only one man. At this works electrolytic methods are used for the manufacture of caustic soda, sodium chlorate and potassium chlorate, as well as chlorine products. Other chemicals include bleaching powder, antimony, pentachloride, aluminium chloride and liquid chlorine. Sulphuric acid was formerly made there also, but the manufacture has now been stopped, and the company produces all its acids at Widnes.

The Baxter Works, also at St. Helens, now manufacture nothing but caustic soda. It may be noted that, in connection with the Hardshaw Brook Works, there is the Kurtz brick works. The manufacture of bricks has long been a side line of the company, and the plant has recently been extended. The metallic brick, for which St. Helens is well known, is a shale brick, and there are several firms in the district solely engaged in this branch of manufacture. On the Sutton Road, near Peasley Cross Station, are the works of the St. Helens Metallic Brick Co., Ltd., and at Ravenhead, in the other direction, is the Ravenhead Sanitary Pipe and Brick Co., Ltd.

American Steel Trade

REPORTS of the American steel trade for the second quarter of the year indicate that some of the companies made larger profits than during the first quarter, despite the pessimistic talk that prevailed for some time in the recent past. Thus the United States Steel Corporation earned $3.06 a share in the second quarter, as against $2.93 in the first quarter, while Republic Steel earnings were $1.34, against $1.25. It is true that operations and prices were generally lower in the second quarter than in the first, but the efforts of producers to reduce operating costs have met with success. Independent steel producers are optimistic over the amount of steel that will be produced in the next two months, although they are not satisfied with the prices now being obtained for finished products. Southern scrap dealers are refusing contracts for delivery for the remainder of the current year at present quotations, but are maintaining stocks in anticipation of an increased demand at higher prices.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

BOOTH, Mr. T. A., Tee A. Bee Works, Idle, Bradford, druggist. (C.C., 15/8/25.) £21 11s. 8d. July 7.

PENDLETON OIL AND CHEMICAL CO., LTD., Croft Street Works, Pendleton, Manchester. (C.C., 15/8/25.) £13 15s. July 6.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

FISON (JOSEPH) AND CO., LTD., Ipswich, fertiliser manufacturers. (M., 15/8/25.) Registered July 24, agreement endorsed on £30,000 debentures, being amount issued of £60,000 (filed under sec. 93 (3) of the Companies (Consolidation) Act 1908), postponing date of payment, increasing rate of interest from 5 per cent. to 6 per cent., and conferring additional security; charged on Eastern Union Chemical Works, Bramford, Ipswich, as additional security, which also extends to the whole series. *£30,000. March 26, 1925.

GRAPHITE OILS CO., LTD., Grimsby. (M., 15/8/25.) Registered July 27, £11,500 debenture, to F. W. Gough, Yatton, managing director of the company; charged on certain inventions, also general charge. *——. April 14, 1925.

Satisfaction

ELLIS (J. E.), LTD. (late DAISY, LTD.), Horsforth, chemists. (M.S., 15/8/25.) Satisfaction registered August 1, £6,000, registered February 14, 1920.

Receivership

SPENCER AND MOORE, LTD. (R., 15/8/25.) J. S. Hassal, of 6, Lord Street, Liverpool, C.A., was appointed receiver and manager on July 23, under powers contained in mortgage or charge dated June 26, 1925.

New Companies Registered

MARBLITE, LTD., 16–17, Devonshire Square, London. Manufacturers of and dealers in enamels, paints and varnishes, etc. Nominal capital, £10,000 in £1 shares.

MELVO, LTD., Manufacturing druggists and drysalters. Nominal capital, £10,000 in £1 shares. Solicitors: Skelton and Co., 90, Deansgate, Manchester.

PHILLIPS AND WOOLF, CHEMISTS AND DRUGGISTS, LTD. Chemists, druggists, drysalters, oil and colourmen, etc. Nominal capital, £500 in £1 shares. Solicitors: Bingham, Hall and Ritchio, 29, Princess Street, Manchester.

ROBINSON, RUDD AND CO., LTD., 17, Back Murton Street, Sunderland. Chemists, druggists, manufacturers and refiners of and dealers in pharmaceutical and chemical articles, drugs, oils, fats, soaps, etc. Nominal capital, £1,000 in £1 shares (500 10 per cent. cumulative preference and 500 ordinary).